Industrial Hygiene Section

SOCIAL SCIENCES

INDUSTRIAL MEDICINE

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Industrial Health, Occupational Diseases and Traumatic Surgery

October, 1943

Plant Physician and Safety Engineer
— And the Cooperation Between Them —

The Organic Industrial Solvents
— In Terms of Their Fire Hazards —

Industrial Health Units
— Designs for the Smaller Installations —

Pruritus Ani and Absenteeism
— Report on a New Form of Adjuvant Therapy —

Industrial Ophthalmology
— And Otolaryngology —

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— In Industrial Health Programs —

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Chlorinated Solvent Exposures
— At Degreasing Operations —

Lead Hazard
— Occurring During Repair of a Burned Ship —

Effects of War
— On the Scope of Industrial Hygiene —

Volume 12 *Number 10*

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DR. LEGGO'S "Plant Physician and Safety Engineer" (page 645) describes the very desirable maximum of cooperation between them, and suggests that after all both are most profitably engaged in "education" and "prevention," the one serving the other as the two combine toward their common objective. The fact that the functions of both can and do blend into united effectiveness is proved by the occasional situation where the medical director is also the head of the safety department.... DR. EASTON'S authoritative paper on the "Organic Industrial Solvents in Terms of their Fire Hazards" (page 647) is an exceedingly exact statement concerning these fire hazards. Recommendations for substitution of carbon tetrachloride and other chlorinated hydrocarbons by gasoline and similar flammable but less toxic solvents have been common practice in the past. At the present time the scarcity of these chlorinated solvents is resulting in even more extensive substitutions by the relatively plentiful flammable solvents. It has generally been regarded that the fire hazards from the point of view of loss of life have not been greatly increased with such substitutions, since concentrations in air of the vapors of these solvents which are safe in so far as health is concerned are only a tenth or less of the lower flammable limit. But the fact remains that more deaths occur from fires resulting from organic solvents than from fatal poisonings by the same substances. And serious fire hazards may still exist even though concentrations of flammable solvent vapors in the breathing zones of workers are kept within safe limits.... DRS. RITTER and DUGGER adapt their "Industrial Health Units" (page 650) for the smaller installations to the most practical utilization of existing facilities. More often than is generally known, this is a major consideration in a small plant.... DR. ALDRICH'S "Pruritus Ani and Absenteeism"

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(page 654) calls attention to one of the medical causes of absenteeism which hasn't been much talked about. Yet DR. CHARLES J. DRUECK'S "Pruritus Ani" (page 704) relates this affliction to "60% of the adult population." . . . DR. HARKNESS, in his "Industrial Ophthalmology and Otolaryngology" (page 658) not only reminds but also emphasizes that "the proper care of the trivialities in medicine is the best preventive medicine that we have to avoid major complications." . . . AMONG the most interesting of the many interesting presentations on the program of the Industrial Hygiene Foundation's Eighth Annual Meeting next month (page 662) will be the study by DR. SAPPINGTON of "Health Problems of Women in Industry." This study was made in actual contact with the problems and the people whom they concern. . . . DR. SNYDER and his associates (page 663) add one more to their careful studies of the treatment of chronic arthritis. . . . OCTOBER and November are months of important assemblies, but none is more important than the second intensive Post-Graduate Course in Industrial Medicine to be given in Brooklyn during the first two weeks of November at Long Island College of Medicine. The preliminary outline of this series of lectures and seminars appears on page 668. It is suggested that physicians desiring further information or wishing to enroll for the course communicate with ALFRED R. CRAWFORD, Office of Administration, 350 Henry Street, Brooklyn 2, New York. . . . DR. JOHNSTONE'S editorial (page 670) might let it be inferred that the 17 leaders in industrial medicine whose photographs and biographies appeared in the September issue were selected on some basis of exclusion of others who were not pictured with them and who are equally important. These 17 men are the present officers and directors of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS; the matter of presenting the portraits and biographies of their predecessors, as well as those who shall succeed them, is a task, and a privilege, for future issues. . . . THE "Standing Orders for Nurses in Industry" (page 696) are the work of the Council on Industrial Health of the American Medical Association. They were published in *J.A.M.A.*, August 28, and are reprinted here in the interest of all possible wider circulation and for all of the well deserved emphasis that can be obtained by

—Continued on page 684.

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*Hardin, P. C.: Cod Liver Oil Therapy of Wounds and Burns, So. Surg., 10:301, (May) 1941.

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DR. JOSEPH H. CHIVERS, medical director of Crane Co., Chicago, has been appointed chairman of the advisory committee to the state division of industrial hygiene, succeeding the late DR. PHILIP H. KREUSCHER. DR. FREDERICK W. SLOBE, Chicago, a new member of the committee, was named vice-chairman.

DR. CLIFFORD KUH has resigned as Director of the California State Bureau of Industrial Health to accept a position with the Permanente Foundation in California. MR. FRED T. INGRAM, Supervising Engineer, is serving as Acting Director in California.

DR. FRANK WILCOXON, of the Atlas Powder Company, has become group leader in charge of the Insecticide and Fungicide Laboratory of the Stamford, Connecticut, Research Laboratory of the American Cyanamid Company.

—*Science*, July 16.

DR. KARL R. LUTHY, formerly of Oskaloosa, has accepted the posion of Medical Director of the Kentucky Ordnance Works, which is located near Paducah, Kentucky, and is operated by the Atlas Powder Company.

—*J. Iowa State M. S.*, September.

DR. HAROLD T. CASTBERG, Passed Assistant Surgeon, U. S. Public Health Service, formerly Acting Chief of the California Bureau of Industrial Health, who had been sent to Oregon to initiate the development of the Oregon State Industrial Hygiene Division, has been assigned back to California as of July 1. DR. THOMAS F. MANCUSO, Assistant Surgeon (R), U. S. Public Health Service, who has been on assignment to the Michigan Department of Health, is being transferred as of June 15 to the Oregon Division of Industrial Hygiene to take the place of DR. CASTBERG.

A NATIVE of New York, DR. SCHWARTZ has been with the Public Health Service for 37 years. His early days in the service were spent in China, Japan, the Philippines, Alaska and the Aleutian

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Islands. Once he conducted extensive studies on human posture. He differed with those who held unequivocally that poor health was associated with poor posture. He had no patience with persons who contended that the Greek athletes of old always stood erect. SCHWARTZ hustled to the Metropolitan Museum of Art in New York, took a look at the statues and came away with the report that the Greeks slouched just like any one else when resting. "And Venus de Milo," he adds today, "stands like a tired clerk!"

—From "Medical Sleuth (DR. LOUIS SCHWARTZ) Solves Industrial Ills," in *Washington, D.C., Star*, August 8.

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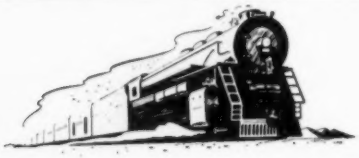

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—From "Alice Hamilton: Pioneer in Industrial Medicine," by JOHN L. PARSONS, in *Medical Economics*, September.

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Water-repelling; incorporates in one cream-formula protection against strong, as well as dilute, acids and alkalies; also for cooling and cutting oils with more than 10% water content, metals and metallic salts, dyes, formaldehyde, phenols, etc.

FEND-L

A water soluble cream which protects against flashes of ultra-violet and infra-red rays during welding operations, and is also an effective sun screen—of value in welding and other work performed in the open, under the sun's rays for long periods of time.

FEND-X

A modern industrial cold cream which rubs well into the skin and serves as a skin conditioner. Beneficial for both dry and oily skins, its use is indicated in all industries. Routine application of Fend-X after washing at the end of the work day leaves skin soft, and serves to prevent cracking.

FEND-O

A semi-water-repelling lotion, affording safe barrier protection in handling powder and explosives such as tetryl and T.N.T.; coal tar derivatives, chlorinated naphthalenes, wood preservatives, wood essences and solvents such as cold water, alcohol and acetone, without interfering with normal functions of skin or skin glands.

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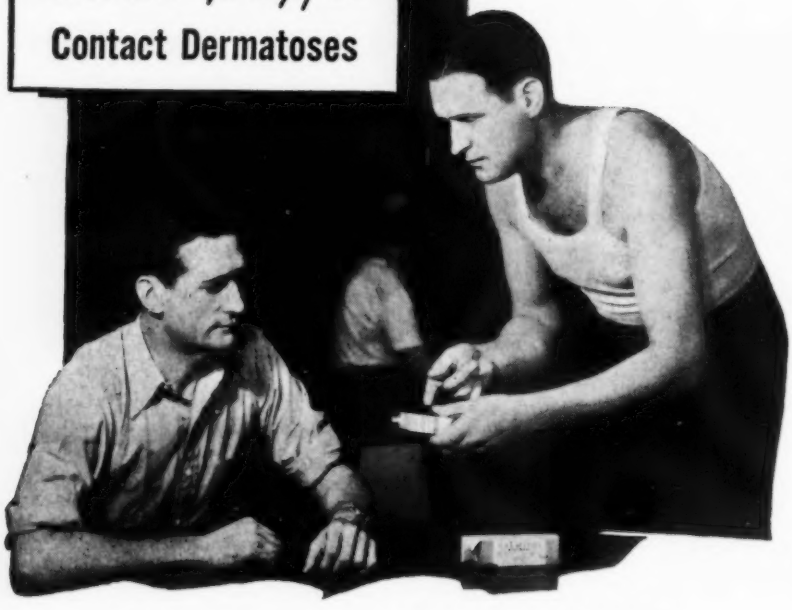
Contact Dermatoses



Through the use of Calmitol, absenteeism due to industrial dermatosis and contact dermatitis can be sharply reduced. Specific in its antipruritic action, Calmitol stops itching quickly; a single application is usually effective for hours. Scratching is prevented and secondary traumatic lesions are not produced. In most cases, relief is so great that workers are able to remain ambulant and apply the medication themselves during rest periods. Through its protective influence, Calmitol enhances the efficacy of other indicated therapeutic measures. Physicians are invited to send for samples.

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CALMITOL
THE DEPENDABLE ANTI-PRURITIC

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dents that interrupted their work. Although the standard retirement age is 65 years, some persons are able and willing to work for many years beyond that age. Many of these oldsters are engaged as watchmen, janitors, elevator operators, and other of the less hazardous employments, and yet 1,793 were given compensation for injuries that rendered them unable to perform their accustomed duties.

—From "Compensated Accidents," in *The Industrial Bulletin*, New York State Department of Labor, June.

TO HELP reduce the incidence of mercury fulminate dermatitis in the explosives industry a new liquid soap has been developed which indicates, by a change in color, the presence of traces of mercury fulminate upon the skin. This reagent soap has the following composition: Diphenylthiocarbazone — 0.18 gm.; Triethanolamine (technical) — 250 cc.; Liquid Soap—750 cc.; Hydroquinone—0.015 gm. The soap is orange in color. In the presence of traces of mercury salts it changes rapidly to a deep, easily recognizable purple.

—From "A Soap Which Indicates the Presence of Mercury Fulminate," by HOWARD S. MASON and ISADORE BOTVINICK, in *Public Health Reports*, 58: 31, July 30, 1943.

ONE of the most common faults found in industrial nurses, whether men or women, is their failure to recognize the need for the interpretation of the compensation laws of the state in which they are employed. As every state has its own compensation, often differing from that of other states, the nurse should make it a point to study these laws in order to help protect the employer from lawsuits for non-occupational injuries, by making out accident reports properly.

—EDWARD F. PERREAULT, R.N., in *Trained Nurse & Hospital Review*.

YOUR committee received a communication in October, 1942, from the Council on Industrial Health of the A.M.A., stating that three companies in Indiana had written to the War Production Board about their interest in developing or extending their industrial health programs. These companies were contacted at once by members of the committee in their locality, and the matter was promptly taken care of, apparently to the satisfaction of the companies.

—From the report of the Indiana State Medical Association's Committee on Industrial Health, in *J. Indiana State M. A.*, September.

Priority Appointments

A SURVEY was made several months ago by a committee appointed by the State Dental Society to ascertain what provisions are made for dental care for industrial workers in Delaware. As a result of this committee's work, the State Dental Society has indicated its willingness to give priority dental appointments to industrial workers in need of emergency dental care. This was done out of consideration for the shortage of available dentists for industrial work.

—From "Delaware's Wartime Dental Program," by MARGARET H. JEFFREYS, R.D.H., in *Delaware State M. J.*, August.

Industrial Survey

THE importance of industrial medicine in wartime is generally acknowledged in principle and will be brought home to Minnesota physicians in fact this month when they receive the card questionnaire from the Committee on Industrial Health asking for whole- or part-time volunteers. The object of the questionnaire is, first, to find out how many physicians are already serving industry in some capacity; second, to create a pool from which industrial needs all over the state can be met by physicians in private practice on a part- or full-time basis. War has provided an impetus to utilization of medicine in industry which is bound to hold over when the peace comes. For industry, it is opening up new avenues to efficient plant operation. For medicine, it affords a sound new method for extension of preventive medicine within the framework of private practice.

—From *Minnesota Medicine*, September.

Too Many Words?

HERE'S a typical case of proliferating wordiness. I found it in one of the better Midwestern state medical journals: "If a program of frequent examination of workers is to be set up, it must be realized that since the time taken by the examination is time away from the job, the form of examination must be such as to obtain in as short a time as possible a maximum of information. This information must allow of the following trends away from or toward the normal state of health shown by the worker in the pre-employment examination. . ." The context of this article reveals that the following condensation (24 words instead of 78) would convey the intended mean-

Serenity ... throughout "Change of Life"

For many women, the menopause..."change of life" ...may be calm and peaceful; or it may be fraught with enervating experiences.

When symptomatology indicates the need for active therapy, Hexital, the new therapeutic agent, spans effectively the period of transition.

Hexital, with its component hexestrol, is significantly less toxic than stilbestrol. Recent clinical findings indicate that the combined use of hexestrol and phenobarbital (Hexital) affords a marked reduction in the incidence of nausea and other by-effects.

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Twofold Action Relieves Spasm

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GASTROINTESTINAL SPASTICITIES

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Pavatrine provides a dual antispasmodic action:

1. **MUSCULOTROPIC**—*local action upon muscle*
2. **NEUROTROPIC**—*through nerve supply to smooth muscle*

—thus effecting relief whether the spasm is of muscular or neural origin.

Bickers*, reporting on the treatment of dysmenorrhea, states that Pavatrine "is non-narcotic and has a morphine-like action."

*BICKERS, WM.: "Primary Dysmenorrhea," Va. Med. Mo., 69:8 (Aug.) 1942.

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Effect of Pavatrine in relieving acetylcholine induced spasm. (Excised rabbit uterus)

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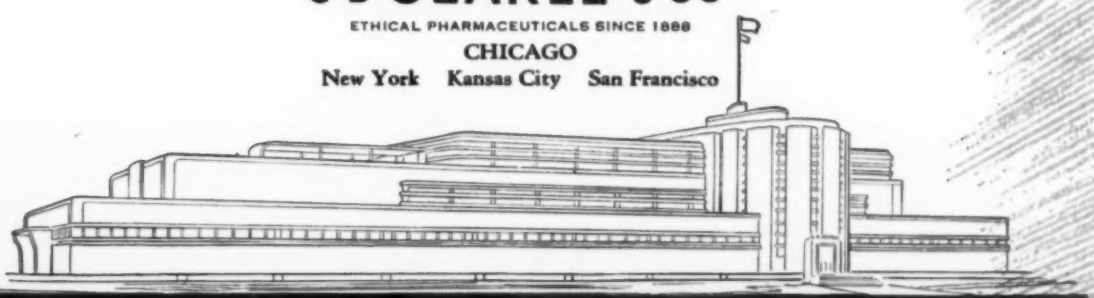

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Now, because of Governmental restriction on fats and oil, PAX offers Super-X—a new development—a sudless industrial skin cleanser.
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ing: "If a program of frequent examination is set up, the examination must take little time. It must also reveal trends in the worker's health."

—From "More Concise Papers, Please!" by JAMES FLEMING, M.D., in *Medical Economics*, September.

Credit Industrial Medicine

IN THE last six decades, the Metropolitan Life Insurance Company reports that the life expectancy of American workers and their families, as represented by the company's millions of industrial policyholders, has increased from 34 years to the record breaking 1941 figure of 63.52 years. In the last three decades, a gain of 16¾ years has been made in length of life, while in the last decade alone a gain of 5½ years has been made. Today, industrial policyholders and their families enjoy a longevity a trifle below that of the general population. Current indications are that in 1942 the wage earners will be practically on the same level with the general population in average length of life.

The Sunset Slope

PHYSICALLY, one is dealing with a body in which there is a degree of dehydration, shrinking, sclerosis, inelasticity, loss of strength and tone, and changes in colloidal structure. There are also atrophies, postural changes, and functional weaknesses dependent on the foregoing factors and on lowered metabolism. The involution of the circulatory system alone may account for senescent changes such as drying and hardening of the skin from an impoverished blood supply. The senile dermis fails to some extent in its important function as a heat regulator and thus we find that older people do not tolerate temperature extremes. It is the old folks who are apt to have heat strokes and who must draw a shawl over their shoulders when they sit in front of the fire on a winter evening. The physiologist and biochemist recognize these changes but do not shed much light on them. According to Dr. A. J. Carlson, of Chicago, more time should be spent on their study and less on their enumeration. And speaking of senescent vascular changes, one writer has paraphrased an easily recognized quotation, saying, a man is as old as his ability to disperse cholesterol.

—From "The Sunset Slope," editorial in *Journal-Lancet*, September, 1943.

Sight and Skill

THE correlation between degree of perfection of visual skills and production level has until very recently been largely overlooked in this country. Some work has been done in England but a dramatic and brilliant statistical analysis of this and many other hitherto unstudied phases of the problem of visual factors in efficiency was made possible through our research program by the cooperation of the Department of Applied Psychology at Purdue University. This breakdown of survey data into almost a million correlations will be an epoch-making study. This joint effort by industry psychology, and ophthalmology seeks to validate technics, validate the needs and proposed instrumentation, establish a scientific yet practical interpretation of visual defects from the standpoint of occupational needs, and to lay a solid foundation for the contemplated program of remedial recommendations both before and after hiring. All the work to date points to a direct and consistent relationship between maximum production, maximum accuracy, and the visual preception components.

—From "Industrial Eye Health Problems," by HEDWIG S. KUHN, M.D., in *Am. J. Pub. Health*, September.

Eye Hazards

IT IS DEPLORABLE, in visiting many war plants, to find the almost complete lack of eye protection. It is not rare to find plants with 400 eye cases per month and higher. Estimates on the cost of lost time accidents reveal that they cost management and its insurance carrier, an average of $351.00 per case for compensation and medical care. The so-called "no-lost-time" case is also expensive, and because they are more frequent, their cost may be more frequent than the lost time accidents. *There is no such thing as a "no-lost-time" accident, for anything that requires a worker to stop working is costly to management.* One has only to compute the time lost going to and from the first-aid station; the

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time lost by other workers who stop to stare and discuss the injury; machine damage, and work spoilage, to arrive at a startling cost. One insurance company has found that a non-compensable accident (no-lost-time) costs an average of $9.26 per case for first-aid and medical care alone. The great cost to the worker can easily be realized by imagining a life of blindness.

—From "What's New in Industrial Hygiene," Division of Industrial Hygiene, Illinois Department of Health, K. M. MORSE, Editor, September, 1943.

"Patient Load"

THE findings in Georgia and Maryland emphasize that it is a fallacy to assume that a large number of physicians per unit of population indicates an oversupply (in the strict economic sense of the term) of physicians, or a small number an undersupply. The ratio of physicians to population constitutes nothing more than an index of the maximum amount of services that can be provided, but whether or not the physicians' potential services are fully utilized will depend not on their number but on the effective demand for services. The ratio is, moreover, only a crude index and does not furnish pertinent information regarding the main problem of determining the smallest number of physicians sufficient to satisfy present civilian demand. As stated above, assuming the same maximum patient load for the physicians of both Maryland and Georgia, it is estimated that in Maryland the number of persons per physician could be increased to 1,200 to 1,500, but in Georgia, because the demand for services is much lower, it could reach 2,000 to 2,400. Although these numerical results are to be accepted with caution, it seems safe to generalize that in different populations utilization of the full working capacities of physicians may be achieved at different levels of ratio of physicians to population. If this is true, a significant corollary is that any plan aimed at utilizing fully the medical resources of a population must be founded on accurate knowledge of the demand for physicians' services and of the amount of work physicians are able to do. Such knowledge can only be gained from data on the patient load or its equivalent.

—From "The Patient Load of Physicians in Private Practice," *Public Health Reports*, 58:36, September 3, 1943.

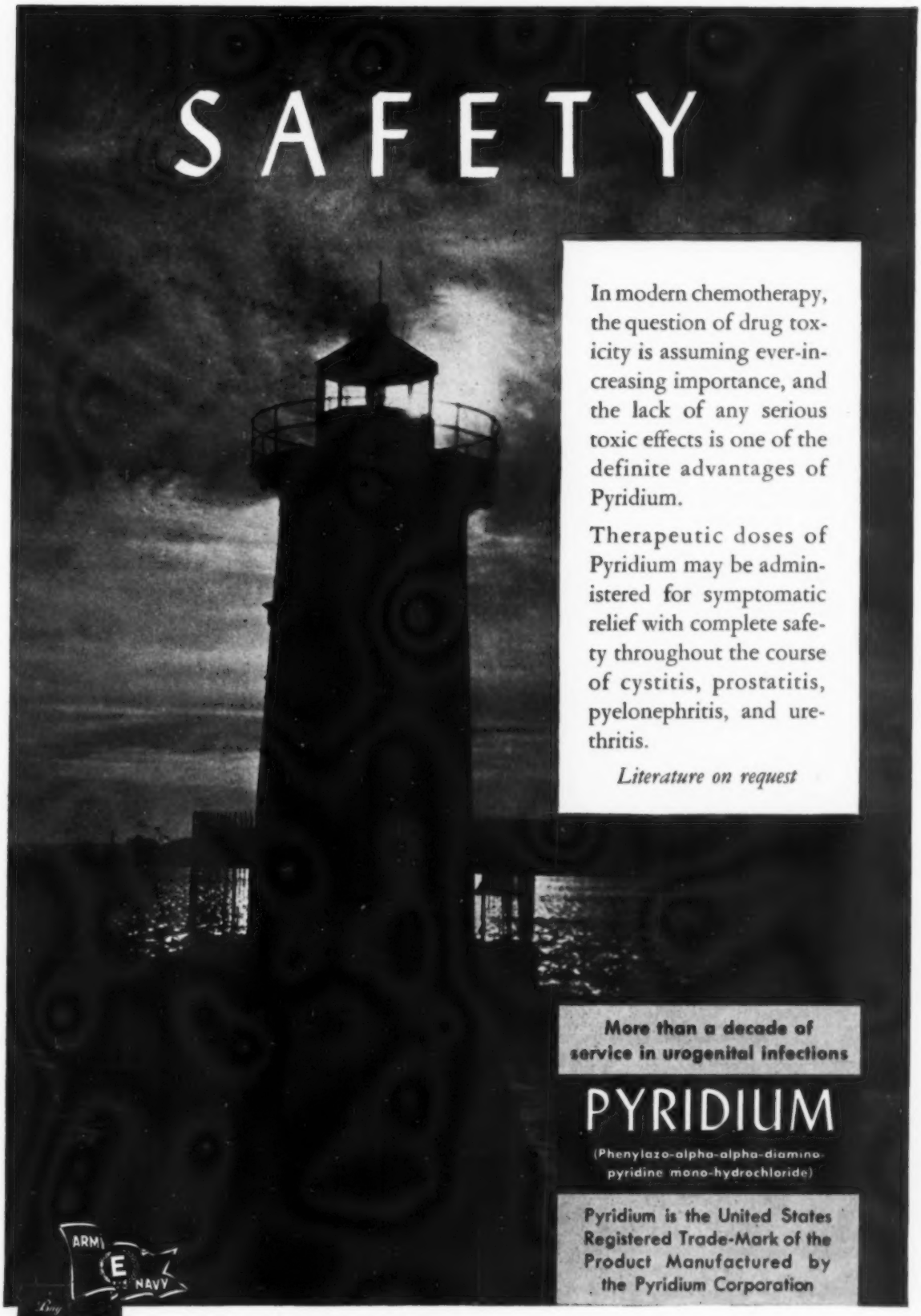
Vitamins and Nutrition

A RECENT publication by the National Association of Manufacturers and entitled "Food, Work and War" has some interesting comments on vitamins. This booklet states: "Should there be any shortage of foodstuffs, either because of inability of available manpower to harvest or to process food crops, or because of transportation difficulties due to the war, the possibility of the supplementary feeding of vitamin-mineral concentrates will take on a new significance. Present thinking on the feeding of vitamin concentrates to wartime industrial manpower may perhaps be summed up somewhat like this: (1) Vitamins should not be fed to the worker unless deficiencies are found by medical and laboratory tests, which can now be performed with relative ease. (2) At present industrial medicine believes a man who is well fed according to high standards of good nutrition does not need any vitamin pills. (3) Good nutrition depends upon good food habits. We are all agreed that most people do not have good food habits and that they must be taught to cook and eat the nutritious foods in the right proportion if they are to enjoy optimum health and capacity for work. (4) The food habits of people cannot easily be changed until their living habits are changed. That is, if they do not spend enough time on proper cooking, if they eat of canned foods almost entirely, or at poorly managed cafeterias and restaurants, they may be in grave danger of not receiving the protective elements of foods needed to maintain optimum health. (5) If people do not get vitamins as a result of their food habits, however, then they should get vitamins in concentrated form in order to avoid deficiencies and the effects these deficiencies have on their health and efficiency."

—From "*What's New in Industrial Hygiene*," September.

Physical Therapy Congress

A WARNING that pensions and compensations may replace individual initiative as a means of rehabilitating injured soldiers and industrial workers after the war, was sounded by DR. HARRY E. MOCK, associate professor of surgery, Northwestern University Medical School. He addressed the American Congress of Physical Therapy. He conceded that in the case of permanently disabled men government support was just and necessary, but he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The first step in the treatment of acute cholangitis is to increase drainage into the duodenum. This objective is best accomplished by inducing a copious flow of thin liver bile to flush out inspissated accumulations and to reduce possible absorption of toxic metabolites. Free drainage of the biliary passages also tends to discourage ascent of the infection, reduce subjective discomfort, and shorten the clinical course.

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Decholin sodium is administered intravenously according to the following plan: 1st day, 3 cc.; 2nd day, 8 cc.; 3rd day and daily thereafter, 10 cc. Oral treatment with Decholin tablets has a milder effect and is useful for prolonged medication.

Decholin and Decholin sodium should not be employed in cholangitis due to calculi, and are contraindicated in complete obstruction of the common or hepatic bile duct.

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called attention to the possibility that government provision for soldiers and workers might tempt the partially disabled to reject all responsibility for themselves and become wards of the government. "Rehabilitation of the disabled implies restoration to economic usefulness," he insisted. He compared the psychology of a sick nation crippled by depression and war with the psychology of an individual crippled by wounds, and he declared that both must cease to think of security from want in terms of dependency. "Both," he said, "must return to the psychology of our pioneer fathers who stressed the freedom of the nation and individual freedom and motivated the same by pride in individual enterprise and accomplishments." . . . FOOT trouble, which was serious even in peace time, has now become an important war problem both in industry and in the army and navy, DR. EMIL D. W. HAUSER, assistant professor of bone and joint surgery, Northwestern university medical school, told the 22nd annual convention of the American Congress of Physical Therapy. Many people in industry are doing unaccustomed work and standing long hours on hard surfaces, he pointed out. In the army, feet which have been used to carrying only the weight of their owner are now asked to carry the burden of a full pack and gun as well.

—*Chicago Tribune*, September 9 and 10.

Chlorinated Hydrocarbons

CHLOR compounds of the petroleum series have a wide use as degreasers of metal, cleansers of textiles, dry cleansers, solvents for rubber and other industrial uses. They are as a group not inflammable and have strong solvent properties. Hamilton divides them into three groups: the saturated (paraffin) group such as methane and ethane, the unsaturated olefins such as ethylene and propylene and the naphthalenes. Methyl chloride, carbon tetrachloride, ethylene dichloride, acetylene tetrachloride and acetylene trichloride are industrially the most important. Tetrachlorethane, the common name for acetylene tetrachloride, is the most toxic of the chlorinated hydrocarbons that have been used in industry. All the substances, however, have some toxicity; Dr. Hamilton emphasizes that the increasing use of heat in connection with their industrial employment, as for example in degreasing with vapors of trichlorethylene or carbon tetrachloride, is far more dangerous than was the earlier method of dipping the material in cold fluid. If such vapors come in contact with a naked flame or with hot metal pipes, decomposition may take place with the formation of the highly toxic gas phosgene. Cases of poisoning with especially rapid development and great severity after brief exposure have most often arisen following the use of carbon tetrachloride fire extinguishers in a confined place. This summary of the toxicity of the chlorinated hydrocarbons parallels that by von Oettingen of the aliphatic and aromatic hydrocarbons, including benzine and the more toxic benzene.

—Current Comment in *J.A.M.A.*, September 23.

New Division

A DIVISION of Industrial Hygiene has recently been established in New York City as a joint program through the cooperation of the New York State Department of Labor, the New York City Health Department, and the U. S. Public Health Service. The staff including a physician, an engineer, a chemist, and a nurse have been lent by the U. S. Public Health Service to carry on an experimental program for six months in the Astoria, Long Island, area. DR. NATHAN MILLMAN is the director of this new division.

—*Industrial Hygiene*, September.

Lots of Meals

MEN and women who turn out the famed Grumman Wildcat fighters and Avenger torpedo-bomber-fighters are among the best and most scientifically fed war workers in the country. Streamlined kitchens of the Grumman Aircraft factory at Bethpage, L. I., prepare 25 to 30 thousand servings of carefully balanced, nutritious food daily. All food is prepared in a central kitchen and is transported to the different plants, one of them 20 miles distant, in special thermos containers. Trucks that carry the food run according to time-table, just like trains. The cafeterias operate on a 24-hour basis. Grumman workers, and the children of working mothers consume more than 16,000 quarts of milk a day,

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—*Health and Nutrition News Letter*, Paper Cup & Container Institute, September 7.

Postcard Survey

IN JANUARY of this year a postcard survey of our industrial medical resources was instituted by the Commission on Industrial Health and Hygiene. (The survey totals do not include Lycoming County, where a similar project was completed by the local medical society several months before the general state enterprise.) At that time there were 8,941 members, of whom 1,944 were in the armed forces. Thus 6,997 might have answered; 3,022 did. This represented 43% of our membership. However, 1,533, or almost exactly 50% of these members, stated that they had no interest in industrial health. Among the 1,500 who are interested, we discovered 185 who are doing full-time industrial, institutional, or life insurance work. In addition, there are 683 who are devoting part of their working day to in-plant service in industry. Besides this, there is a large group of physicians interested in accepting an industrial health practice. Forty-one of these desired full-time placement, while 10 times that number (437) desired only part-time work. At the completion of this analysis all postcards were returned to the office of each county medical society. In this way there is a record easily accessible to all interested parties—employers, physicians, or the local Procurement and Assignment office. The postcards were intended for this purpose and it is hoped that they are proving useful.

—From the Report of Pennsylvania Medical Society's Commission on Industrial Health and Hygiene, CHARLES-FRANCIS LONG, M.D., chairman, *in Pennsylvania M. J.*, August.

COMMENT and OPINION

PATRIOTISM is a personal quality, inherent in each individual in varying degrees and intensities, and cannot be instilled by recruiting offices, or by the local chairman of the Procurement and Assignment Committee. These merely provide the outlet for patriotic service. Some will elect to serve their country in the armed forces, and some will seek selection to serve at home.

—From an Editorial in *Northwest Medicine*.

SOME Federal departments maintain emergency rooms, but almost all of them lack the services of a physician. There is no uniformity in the type of medical service offered by different departments. Sometimes nurses do little more than check up on malingering on the part of government employees. In spite of the fact that the government is urging private employers to adopt industrial hygiene programs, and in spite of the fact that the government is now the largest employer in the nation, it lags far behind progressive corporations in protecting the health and lives of its employees.

—*Washington, D. C. Post.*

THE recognition of industrial health as a business item by the larger manufacturing plants of the state was a distinct step forward, but in Massachusetts the majority of our workers are employed not in the large, but in the relatively smaller factories. In these the approach is more difficult, the problems are more dispersed and the solutions more complex. It is often difficult for the manager of a small plant to see how he can possibly change his methods, or to see why he should be expected to do so when a health hazard has been merely indicated as a possibility, and not proved to have hurt the workers in any way.

—From "Progress in Industrial Health in Massachusetts," by DWIGHT O'HARA, M.D., in *Industry*, August.

DERMATITIS among fruit and vegetable canners is quite common. The types of dermatitis in the canning industry are much alike regardless of the material that is being canned. The best protection is the wearing of rubber gloves, impervious sleeves and impervious aprons. Since the canning of fruit and vegetables is an industry essential to the war effort priorities for the purchase of rubber gloves to protect workers can be obtained. The impervious sleeves and aprons are not on priorities. They can be purchased from the West Disinfecting Company, Long Island City, N. Y., the Milburn Company, Detroit, and Don-Ed Fabrics, Inc., New York.

—"Quiries and Minor Notes," *J.A.M.A.*, September 11.

NATIONAL NURSING INVENTORIES

	1941	1943
Total returns	289,286	259,174
Active		
Institutional	81,708	77,704
Public health	17,766	18,900
Industrial	5,512	11,220
Private duty	46,793	44,299
Other	21,276	18,476
Inactive but available for nursing	25,252	38,746 (of these 23,576 are married and under 40)
Inactive, not available	90,979	49,829
In Nurse Corps of Army and Navy	6,371	over 36,000 (precise data not available)

—From "Wartime Nursing is Different," in *J.A.M.A.*, September 11.

Right now . . . another war is being fought

. . . fought and won—by the hundreds of industrial medical directors and their staffs, who are waging relentless war on that prime saboteur of production hours, the "common cold" and its complications, by means of planned group immunization with Oral Cold Vaccine Tablets.

Immunization by means of Oral Cold Vaccine has long since passed beyond the experimental stage

Numerous published reports of controlled tests furnish conclusive evidence of immunity amounting to as high as 85% to 90%. Several reports from industrial organizations, showing lost time reductions of from 60% to 80%, are outlined in *Management Review* (Feb., 1942).

Treatment with Oral Cold Vaccine has also proved its value in salvaging work hours

The response to treatment with Oral Cold Vaccine, instituted after a cold has developed, has been no less than dramatic. The administration of from 8 to 10 tablets per day has so accelerated immunization that abatement of symptoms has been so prompt that no work time was lost.

SHERVAC, Oral Cold Vaccine Tablets A practical means for group immunization

Being especially packaged for convenient dispensing in a cellophane enclosure holding 12 tablets, Shervac meets all requirements for convenience in serving groups. As 12 tablets usually suffice for one immunization or one therapeutic treatment, this packet prevents waste and minimizes cost.

SHERVAC—A Sherman Product

Included in each small, tasteless Shervac tablet are both the whole and the soluble antigenic products of approximately 60,000,000,000 organisms representing: Pneumococcus; Streptococcus; B. Influenza; M. Catarrhalis; Staphylococcus Aureus and Albus; B. Friedlander; H. Influenza.

The organisms contained in Shervac are processed without the application of heat. Heat being known to affect the antigenic potency of vaccines, the Sherman process insures retention of the full antigenic potency.

Being fully detoxified, Shervac causes no gastric distress or other undesirable reaction.

Group immunization can be readily adapted to any conditions

Through the employment of the Shervac cellophane protected packets of 12 tablets each, the matter of distribution to employees, gratis or otherwise is greatly simplified and—equally important—freed of waste.

The cost of group immunization throughout the entire "cold season" is surprisingly small in comparison with the saving of both time and expense to management and employee alike.

Write for particulars . . . sample of the Shervac packet, cost per employee, and suggested plans for conducting immunization programs.

Put the Proved Therapeutic and Prophylactic Properties of SHERVAC ORAL COLD VACCINE To Work in Your Plant

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DETROIT, MICHIGAN

THE BENEFITS OF MULTI-VITAMIN PREPARATIONS AS REPORTED IN THE RECENT A. M. A. ARTICLE:

Well Filled...

But Not Well Fed!

DON'T LET A DIETARY DEFICIENCY SABOTAGE HIM

Most factory and office employees . . . as well as many other people . . . eat merely to satisfy hunger. Their meals are varied, certainly, but more often than not they are nutritionally inadequate. Because of this, millions of war workers are suffering the detrimental effects of dietary deficiency.

Only recently the Surgeon-General of the United States Public Health Service revealed the gravity of this situation by stating:[2]

> "Forty per cent of the American people are malnourished, suffering from some form or type of malnutrition. A correction of this condition would create a new America."

Efficiency, vigor and morale depend largely on proper nutrition. Since food habits are hard to change, the supplementary administration of vitamins considered essential is the simplest and most practical method of preventing vitamin deficiencies.

As a physician, you appreciate that a dietary deficiency can rarely be attributed to the lack of one vitamin alone. In most cases, a deficiency in one vitamin is accompanied by a deficiency in other vitamins. Symptoms caused by missing dietetic factors may be so mild at first as to escape detection. Therefore, it is safer and more desirable to prescribe a multi-vitamin preparation like VITULES as a nutritional adjuvant.

[1]Council on Pharmacy and Chemistry and Council on Foods and Nutrition: The Proper Use of Vitamins in Mixtures, J.A.M.A., 119:948:1942.
[2]Editorial: J. Nat., Med. Assoc., Vol. XXXIV:252:1942.

WHY VITULES IS THE MULTI-VITAMIN PREPARATION OF CHOICE!

Highly Important Advantages:

1 **MEETS HIGH MEDICAL STANDARDS**—VITULES are designed to bring the average diet up to or above the high vitamin standard established by the Food and Drug Administration.

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3 **EASY TO TAKE**—Small, gelatin capsule dissolves quickly. Semi-solid mass permits rapid absorption. VITULES are well tolerated, too.

4 **ECONOMICAL**—1 capsule plus 3 ozs. of citrus fruit juice will provide minimum daily adult requirements necessary for adequate nutrition.

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Intensified Muscular Effort..

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AND MYOSITIC PAIN

Many workers, heretofore unaccustomed to the muscular effort required of them in defense and other plants, will develop painful myositic and rheumatoid conditions with the advent of cold weather. For prompt and prolonged control of these uncomfortable and often incapacitating affections, Baume Bengué effectively provides the relief needed. Its menthol and methyl salicylate induce a marked active hyperemia which removes toxic metabolites from involved joints and muscles. Systemic absorption of the salicylate contributes further to its analgesic influence.

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Do Welding Rays Cause Sterility?

THERE seems to be a fairly widespread rumor that arc welding causes damage to the reproductive organs so that the welder, male or female, is unable to have children. However, the ultra-violet rays which are given off in arc welding have very little power of penetration. Ordinary clothing absorbs a good part of the rays, and the rest are absorbed in the topmost layers of the skin. None of the rays get through to the vital organs of reproduction. The welding arc also produces infra-red rays, the kind that that produced by the "baking lamps" in doctors' offices. These rays can penetrate somewhat deeper than the ultra-violet rays of the welding arc, but, as everyone knows who has had a baking-lamp treatment, they produce a good deal of heat as well. Before they could cause any real damage to the vital organs, a definite sensation of burning would be noticed and the effect of the burning would be quite uncomfortable. The only rays which are known to be capable of causing sterility are x-rays. Experiments have been conducted in industrial plants to determine whether x-rays are emitted by the welding arc. Welders carried dental x-ray films in their pockets for weeks at a time to test whether the electric arc produced x-rays, but the results failed to indicate even the slightest amount of x-ray exposure. It is very unlikely that the welding arc of itself can cause sterility. On the other hand, welders are also subject to metal-fume fever and to lead or manganese poisoning. Lead poisoning is a hazard which occurs when metals covered with lead paint are cut by either the electric arc or the oxyacetylene flame. The intense heat causes the formation of lead fumes which are capable of producing rapid and severe poisoning of the welder. This has become a real danger in the shipyards, where surfaces already painted with red lead are being welded into place in order to speed up production. Unless proper precautions are taken, cases of serious lead poisoning are likely to result. Lead poisoning can and does cause damage to the vital sexual tissues, resulting in sterility and miscarriages. Usually, however, lead poisoning causes other symptoms as well, such as fatigue, listlessness, poor appetite, constipation and abdominal pain. In summary, it appears to be highly improbable for arc welding rays to damage the reproductive organs. On the other hand, if welding fumes are not properly controlled, it is possible that lead poisoning or metal-fume fever may have a bad effect. The answer, therefore, lies in the effective control of welding fumes.

—San Francisco *People's World*, May 15, quoted in *California & Western Med.*, August.

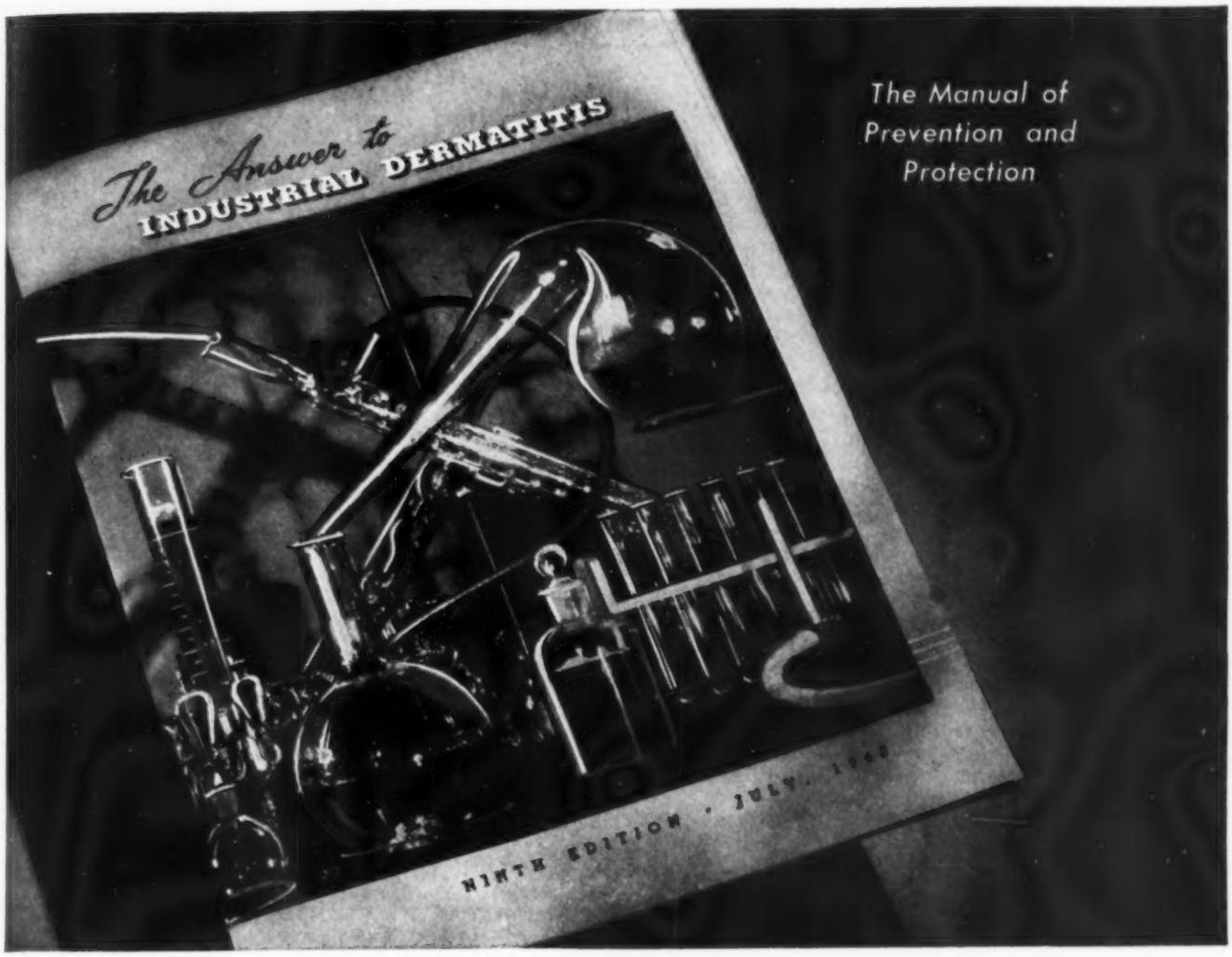
Trained First Aiders

A RECENT accident at East Pittsburgh demonstrated the value of first-aid training. A workman sustained a badly fractured leg when his foot came in contact with a drive pulley on an overhead fan. He was working on a platform some 14 feet above the floor and the impact threw him face down into a very confined area. First-aid men were promptly called to the scene of the accident. The injured workman was made comfortable until the plant protection rescue squad arrived with proper facilities for lowering the victim to the floor level. In the intervening time the doctor arrived and immobilized the broken leg before moving. What a contrast to the old method of untrained fellow workers with improvised equipment manhandling the injured worker in their haste to get him to the medical department, generally in a state of shock and with additional damage to the broken leg. Incidents such as this have confirmed the need of assigning qualified first-aid workers to the handling of injured or sick employees from the scene of the accident to the medical department, or, when conditions warrant, making the victim comfortable at the scene until proper medical care can be obtained to prepare the victim for transportation.

—From *Westinghouse Safety News*, September.

Food Without Labor

THE financially poor, the financially unfortunate appear to have been with us throughout recorded history. The common saying is: "The poor will always be with us." Maybe so, at least in a relative sense. For there is also poverty in foresight and poverty in individual endeavor. In so far as this is due to poverty in heredity, common sense seems to say that, as knowledge grows, we must apply new measures to decrease the production of the chicks that chirp but cannot or will not scratch. Unless reason based on understanding effectively guides so-



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cial evolution of tomorrow in that direction, I see no escape from the degeneration that invariably follows biologic parasitism, except the ancient law of "tooth and claw." The killing of millions of pigs for fertilizer, and restricting the production of such important foods as meats, wheat and corn, all by Federal regulation, do not (in my judgment) square with our concern for an optimum diet of man (the poor included) even in our own land.

—From "Some Obstacles in the Path Toward an Optimum Diet," by A. J. CARLSON, in *Texas Reports on Biology and Medicine*, 1:1, Spring, 1943.

Leading Defects

I KNOW of no comprehensive analysis of types and frequency of physical disabilities found on preplacement physical examinations in Georgia. The classification of defects found at army induction stations, of registrants from local boards in Georgia, however, is of interest, as it gives a cross section of disabilities found in our younger adult male population. It should be remembered, however, that the selective service rejectees in many instances seek service in industry, thus swelling the industrial ranks with individuals having physical defects. The histogram shows that in the total group, the 10 leading defects found in order of frequency were: (1) nervous and mental conditions; (2) venereal diseases; (3) dental defects; (4) musculo-skeletal defects; (5) heart and blood vessels; (6) eyes; (7) lungs; (8) herniae; (9) genito-urinary diseases and conditions, and (10), ear defects. Many factors must be considered in interpreting these findings. Color differences are illustrated by the fact that venereal diseases lead the list in the colored group, but are in tenth place in the white group; dental defects are second and the lungs are third but in the colored group they occupy fifth and eighth places respectively.

—From "Industrial Health," by L. M. PETRIE, M.D., Industrial Hygiene Service, Georgia Department of Health, in *Fulton County Med. Society Bull.*, September 16.

He Claimed Infection

ON A SUMMER'S day in 1942 the administrator of the CIO health plan in Cleveland told this story: "I've been spending hours with the workers at a steel mill. About four years ago one of their steady workers became ill. The company wanted to lay him off; the union opposed it, and he was kept at work. The man claimed he had an infection from one of the oil processes and there was much effort to get industrial compensation. Neither management nor labor knew exactly what the difficulty was, but he became sicker and sicker and recently became a hazard to men working with him as his accidents increased. The union collected money for his family for a few weeks. Just the other day, while trying to keep some kind of job for him the union learned that he had syphilis—had it four years ago—did not follow treatment—and is in so advanced a stage that he can never work again. The workers are all angry with him for 'taking them in'." Further discussion revealed that the man did not understand his illness and acted in blind fear, while his employer and union spent fruitless hours trying to find a solution based on inadequate facts. This story was told to a case worker, who was also a member of the Social Service Employees Union.

—From "Industrial Workers and Social Services," by ROBERT M. SCHMALZ, in *Survey*, July.

Vitamin Experience

TWO of the outstanding precision instrument manufacturers in the country maintain regular vitamin distribution programs and report consistently helpful results in both plant and office. Vitamin feeding in a well-known industrial factory in Ohio, *Nation's Business* reported in April, 1941, has saved the company an important sum of money in cutting down rejections because of mismatched parts and resulted in increased efficiency and improved general health. Several nationally known textile mills have recently adopted programs of increasing their manpower efficiency with daily distribution of vitamins and min-

TO HELP PREVENT VITAMIN DEFICIENCIES

TRY A **STRASCO VITAMIN**

Special Test Plan . . . . .

• You want your vitamin program to meet the specific needs of the workers in your care. That's why Strasenburgh offers a Special Test Plan which will be designed to meet the conditions in *your* plant. For over four years many specially designed Strasco Vitamin Programs have been supplementing the diet of workers in a wide group of industries. For details on a Strasco Vitamin Plan for your plant mail the coupon below.

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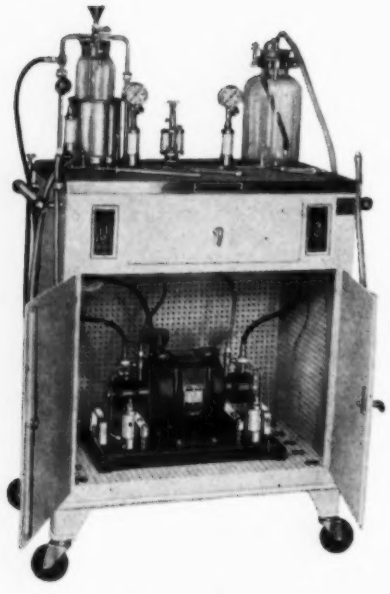

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erals. Three of the largest national advertising agencies distribute vitamin-mineral concentrates to their many hundreds of office employees and report improved health, morale and work production. The medical department of a big insurance company which gives vitamin supplements to its employees reports a noticeable reduction in the amount of time lost from colds. The biological laboratory of one of America's pre-eminent schools of technology and one of the most prominent metallurgical laboratories distribute vitamin-mineral concentrates to their staffs daily. Six hundred office workers in a large Pennsylvania industrial operation also take vitamin supplements daily. The medical director says: "We find them helpful in fighting common respiratory infections which cause so much lost time among workers." Three of the world's largest and most vital airlines, whose planes today span the oceans between continents regularly, are supplementing the already carefully supervised diets of their flying personnel with vitamin-mineral concentrates. One of America's biggest aircraft corporations, knowing how vital is its performance in our war effort, is feeding vitamin-mineral tablets by a controlled daily distribution to its employees. In the *New York Times* of January 28, 1942, is described an experiment conducted in an airplane factory. "The results of the distribution of a vitamin concentrate among the workers were so satisfactory, the reduction of fatigue and irritability so noticeable, that after a few weeks we were receiving calls from workers' wives asking for the name of the product." In wartime it is more vital than ever for the men and women who serve America's great communications networks to be on the job. One of the foremost of these utilities, serving in the nation's most highly industrialized area, safeguards the health of its members by daily distribution of vitamins and minerals. When a program of supplemental vitamin feeding was launched recently in one of our biggest war industries, absence due to illness began to decrease almost at once. The president of a northwestern plant writes: "We began the administration of vitamins in December, 1940, to 350 employees. During the winter that followed, there were two or three severe epidemics of colds and influenza, but the highest number we had absent due to illness at any one time was eight employees. This was a far better record than we had had any previous year. In some winters more than half the employees had been absent from work during the month of February. Eighty-eight per cent of our employees asked us to continue the plan."

—From "A Step Forward in Manpower Maintenance," vitamin study, by Lever Brothers Company.

Case-Finder

THE industrial physician is in a unique position in syphilis control programs because of his relationship with the worker, the plant officials and the private physicians and clinics. A syphilis control program that is well carried out cannot but help to bring these groups closer together. The private physician often looks at the industrial physician with fear that he will lure patients away from him. It is the duty of the plant physician to keep workers in good physical condition and, therefore, he must constantly be on the lookout for pathological conditions. The plant physician is not permitted to treat conditions that are not traceable to employees' occupations or to accidents, and he must, therefore, refer workers to their private physicians for the correction of defects. Very few of these cases would otherwise reach the family physician until symptoms interfere with their livelihood. In case of syphilis the plant physician acts as a case-finder for the private physician. He does not attempt to give treatment, but refers the case to the employee's private physician for treatment.

—From "Syphilis Control in Industry," by HAROLD A. VONACHEN, M.D., in *J. Indiana State M. A.*, June.

Their Task Not Easy

THE practice of industrial medicine and surgery is difficult to define and to limit, but principally it is the practice of the best-known medical, surgical, preventive and public health measures as it applies to the worker in industry, especially as it is modified by the employer-employee relationship and responsibility. The successful practice of this specialty is by no means simple and easy. In the usual relationship of private patient and physician, the patient selects his own physician, has unlimited confidence in the doctor, and

NATURAL B DOES IT!

IN CLINIC and private practice, as well as in tests on laboratory rats, comparisons of B-vitamin therapies consistently show two facts:

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2. *Fully effective* results follow the use of *natural* vitamin B complex.

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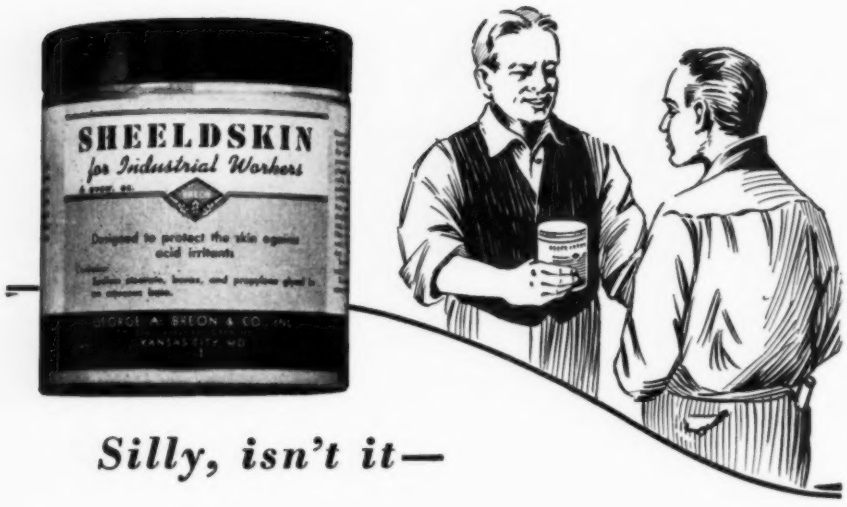

Silly, isn't it—

to tell a workman to put on invisible gloves to protect his hands and arms — sort of like "the little man who wasn't there".

The inconvenience of gloves *isn't* there when Sheeldskin is put on. No awkardness in manual operations; no hampering of even delicate manipulations; in warm temperatures, no smothering of hands.

But protection is there. Sheeldskin protects against grime and grease, against acid vapors and powders. A thin film covers the skin, closing the pores against the penetration of irritants.

Under running water; no added soap, the irritants and grime wash off, leaving the hands cleaner than they were before.

Because of application and removal, comfort in use, and, most important, *protection;*—machine workers* are looking for Sheeldskin.

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*Some office workers, too, (especially those in the mimeographing departments) and housewives like Sheeldskin's protection.

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is easily satisfied by whatever the doctor does or recommends, and then pays for this treatment himself. On the other hand, the patients who come to the plant or company industrial physician and surgeon are sent by someone in the organization to a doctor who is usually not previously known to the patient nor his friends or relatives. He frequently comes with a chip on his shoulder and with the illusion that the company physician is there primarily as a company representative. He suspects an unfair grade of service, perhaps biased and not to his best welfare, and, as so many patients put it, "simply to get him on the job in the shortest possible time at the least expense to the company." Fortunately, these erroneous ideas are being rapidly dissipated by the quality, character and ability of the present-day industrial medical specialist. Add to this picture of the industrial patient the conversations, conferences and interviews of the employees, his family, wife, children, aunts, uncles, parents, distant relatives, and even neighbors. They all want to know what is being done for the patient and have their own ideas as to what are the proper procedures. Then add the doubts, the uncertainty and confusion brought about by having the family physician consulted as to what should be done and you really have an idea of the mental attitude of patients that are sent to company physicians. Again add the problems of temporary total disability compensation payments, and the question of claims for permanent disability. It is really amazing that we are able to get as many of our patients well as we do. Our task as industrial physicians and surgeons requires the best possible medical service because our work is checked up from every possible angle. Another thing that plays a part in this setting is the fact that the employer pays the expenses for hospital, medical and nursing services, and frequently these services are not appreciated to the same extent that they would be if the patient had to pay for them himself. So, we must take our hats off to the work and daily accomplishments of the industrial physicians and surgeons. Their task is not easy. They must be detailed in their history-taking, meticulous and thorough in their examinations, accurate in their diagnoses, and tactful in all their procedures to the nth degree. That the employing company or insurance carrier is satisfied with their work is just a coincidental accomplishment.

—From "Organization of Medical Services in Industry," by EDWARD C. HOLMBLAD, M.D., in *J. Indiana State M. A.*, June.

Diet Plus

THE average American diet is deficient in vitamin-mineral content. (2) Vitamin-mineral deficiency may be a cause of dental caries, gingivitis, stomatitis and pyorrhea. (3) Prevention of dental caries, the most prevalent dental disease of the white race, should be the aim of every practitioner of dentistry. (4) Parent education is a prime necessity in achieving both proper food consumption and adequate vitamin-mineral intake. Simultaneous education of the teacher and the child is important. (5) Although a corrected diet helps to arrest and prevent dental caries, it is clear that the best results are achieved from a balanced diet supplemented at all times by an adequate vitamin-mineral preparation, and more particularly so during the formative period of the teeth.

—From "Vitamins and Minerals in the Prevention of Caries," by ALVIE R. LIVERMORE, D.D.S., in *Dental Survey*, September.

Tuberculosis Peril

THE danger of tuberculosis in industry lurks in the small shop which lacks a strict health supervision program, DR. FRED B. WISHARD, medical director of the General Motors plant at Anderson, Indiana, said yesterday in speaking on the industrial health program of the 30th annual Mississippi Valley conference on tuberculosis. Citing figures from employment records in the plant he represents, 4.2% of workers hired in 1942 showed signs of having had tuberculosis lesions, as compared with 1.8% previously. He attributed the rise to employment of older men, army rejectees for the most part. He said it was too early for any appreciable rise in active cases of tuberculosis through the breakdown of such workers, but he stressed that in large plants likely victims were watched through periodic chest x-rays. Smaller shops have no such service, he said, and for that reason may be sought out by the employee who knows he could not pass an x-ray examination. Community tuberculosis control programs are the

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*Hamilton, J. E.: Amer. Jl. Surg., 58:350-364, (Dec.) 1942.

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Tarbonis *Cream* . . .

A therapeutic agent for treatment of industrial dermatoses . . . Proved in the exacting light of actual use

A year ago TARBONIS CREAM, a therapeutic agent for industrial dermatoses, was presented to us. In that year it has been placed in several hundred plants for trial in the treatment of industrial dermatoses. Comment has been uniformly favorable and re-orders have been substantial.

A. S. Aloe Company with 83 years experience and prestige in the surgical and hospital supply field, therefore takes pleasure in recommending TARBONIS CREAM—without reservation—to its customers. Tarbonis is remarkably effective in seborrheic and eczematoid dermatitis, folliculitis, dermatological irritations due to coolant oils, sulfonated mineral oils, solvents, reagents, etc.

Actual Composition

Liquor Carbonis Detergens	5%
Lanolin U. S. P.	5%
Menthol	0.1%
Special Cream Base qs. ad.	100.0%

Write for users list, and details of the completely guaranteed introductory plan.

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Industrial Division

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only safeguards in such instances, a fact which multiplies the responsibility of public agencies.

—*Chicago Tribune*, September 9.

Scope of Industrial Health

INDUSTRIAL health problems are not merely actual cases of accident and disease contracted in the shop, in the view of the UAW Medical Research Institute. Its conception is so much broader, as sketched in the union education monthly *Ammunition*, that it may be termed revolutionary in medical approach. "An industrial health problem arises," says the institute, "when a worker discovers that his capacity for performance in industry and in the community is diminishing. From this point of view questions of nutrition, housing, transportation, heart disease, diabetes, ulcers, high blood pressure, are industrial health problems just as toxic fume poisoning, silicosis, lead poisoning and exposure to excessive heat, noise and dampness are problems. Unless this basic concept is accepted, industrial health programs cannot be successful. The maintenance of the general health and general well being of the worker should be the central theme of an industrial health program, with primary emphasis placed on the prevention of disease and accidents." The majority of workers examined at the Medical Research Institute, its doctors say, "present symptoms which are very much alike for workers either at similar types of work or in a similar work environment." These symptoms either subside or disappear after a period of time away from work and recur when the men return to their former jobs. The symptoms are always lessened, it was found, by the introduction of safety measures. "Only under extreme pressure by government health agencies and labor organizations," says the institute, "have industries taken the first small steps toward improvement of working conditions."

—*Brewery Worker*, Cincinnati, September 1, 1943.

Smoke It Out

IF GONORRHEA were an upper respiratory disease or a disease of the digestive tract, in fact anything but a disease contracted through sexual intercourse, headlines would flaunt the failure of the medical profession and the public health authorities to stop its spread. Its morbidity, the time loss it causes, the expense which treatment entails, the medical services which are absorbed in treating it, all these factors would promote a prompt, energetic, and realistic fight to the finish against it. Instead, gonorrhea hides behind prudish and emotional prejudice. In hiding, it is at its worst. The time is swiftly coming when no infectious and communicable disease, even a venereal disease, will be permitted to spread practically unmolested through the general population. This time will come the quicker if every physician will enlist in the battle to find gonorrhea, to bring about the investigation of every contact, and to treat every patient until he is no longer infectious.

—From "Has Gonorrhea Been Driven Underground?" by A. L. CHAPMAN, M.D., and A. R. CAMERON, M.D., in *Delaware State M. J.*, August.

Tetryl

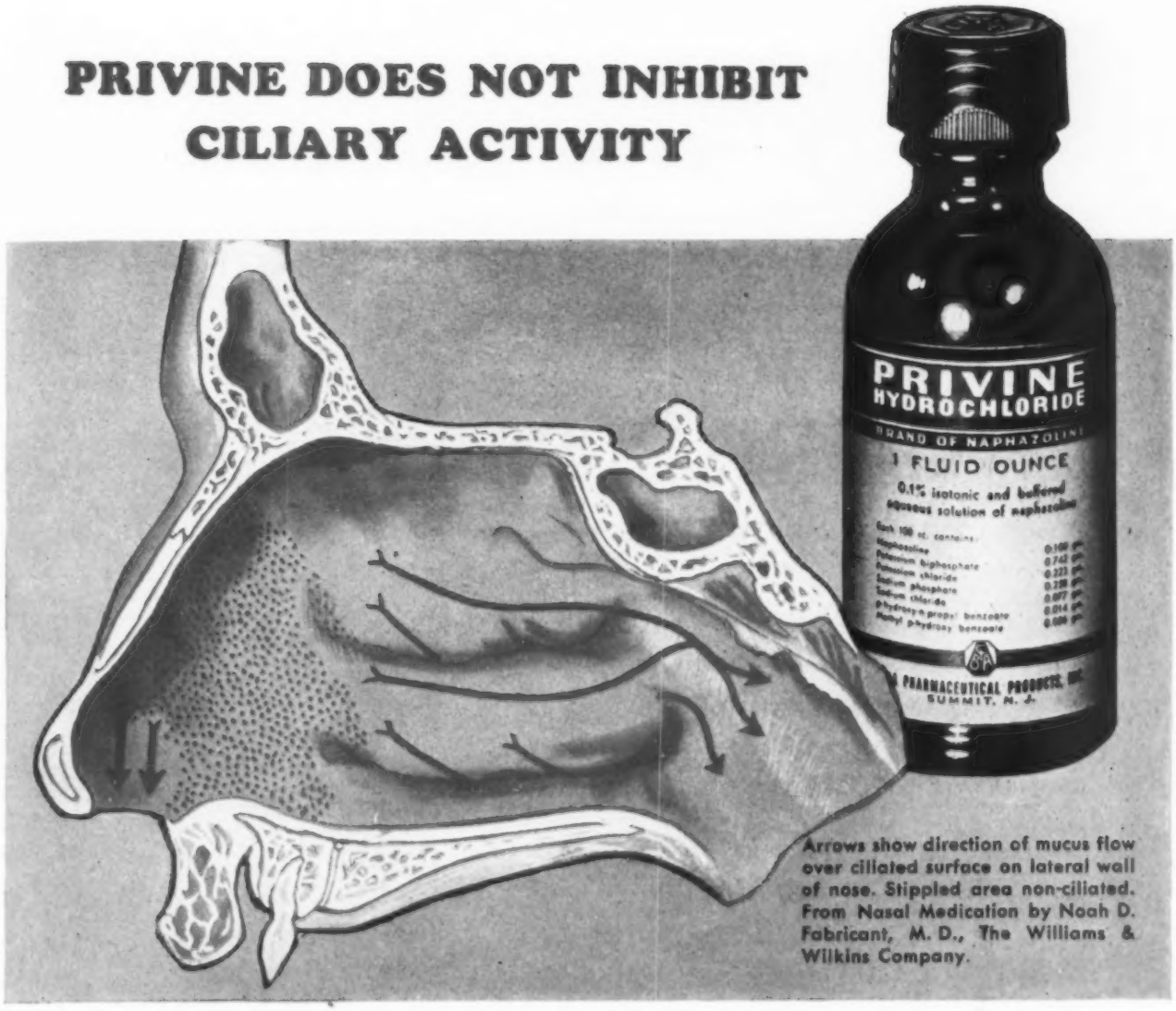
DERMATITIS caused by tetryl is probably the most frequent skin hazard accompanying the manufacture of munitions. It occurs in the making of tetryl itself, especially in the drying house where about 50% of the workers develop dermatitis from it, in pellet production, and in fuse and booster loading. One shell loading plant, for example, with a working population of 6,364 exposed to tetryl has reported 1,904 (30%) having tetryl dermatitis in the first six months of operation. Dermatitis generally occurs during the first three weeks of employment among those who have never before been exposed to the material, cases reaching a maximum number about the third week. From one to four weeks after developing dermatitis, most workers become "hardened" and are no longer irritated by tetryl. Especially is this true if they continue working while being treated. A small percentage of the workers apparently never become completely "hardened," and develop dermatitis whenever exposed to tetryl, even in minute quantities.

—From "Dermatitis Among Munition Workers," by LOUIS SCHWARTZ, M.D., in *Trained Nurse & Hospital Review*, July.

Dividends

OUR latest endeavour has been along the lines of educational nutrition work through the use of notice boards, plant magazine, distribution of fruit throughout the factory," points out F. W. Marsden, personnel manager of Beatty Bros. Ltd., Fergus, Ontario, one of the

PRIVINE DOES NOT INHIBIT CILIARY ACTIVITY



Arrows show direction of mucus flow over ciliated surface on lateral wall of nose. Stippled area non-ciliated. From Nasal Medication by Noah D. Fabricant, M. D., The Williams & Wilkins Company.

THE first line of defense of the upper respiratory tract is the mucociliary layer which is surprisingly efficient in its action. Direct ciliary action helps keep the mucus film in constant motion toward the nasopharynx—entrapping bacteria and offering considerable resistance to penetration of the epithelial layer. Therefore nasal medications which prove harmful to ciliary action impair a highly important nasal function.

PRIVINE* HYDROCHLORIDE (Brand of Naphazoline) a new, effective nasal vasoconstrictor giving prolonged symptomatic relief from two to six hours, has been shown by animal experiments to act favorably on ciliary activity. ***PRIVINE HYDROCHLORIDE*** prepared in line with present day standards restores and preserves this natural defense mechanism . . . ***Available*** in 0.1% solution in 1 oz. bottles and also 0.05% in 1 oz. bottles for children.

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LIME and other minerals deposited by boiling, if permitted to accumulate, cause tarnishing of instruments. Best safeguard is absolute cleanliness.

At end of each day rinse boiler, drain and wipe clean. Use rain water or distilled water, when possible, to avoid deposit of lime or scale.

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ARMY NAVY
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FREE ON REQUEST—Illustrated booklet "Precision Technique," with suggestions for sterilizer and instrument care.
Sterilizers

companies with a health and medical program. "We are convinced that these and other techniques have produced results in better attendance, better work and happier workers. In these days, a health program for industrial workers is a necessary step towards efficient, sustained production." The British American Bank Note Co. Ltd., Ottawa, reports that it has a definite health plan for workers, involving free physical examination, inspection of home conditions, first aid, nursing service and regular medical check-up. In operation the plan has helped and encouraged employees, giving them new points of view regarding sanitation and hygiene, with resulting personal efficiency. R. A. Robertson, secretary-treasurer of George Weston Ltd., Toronto, states that "in our particular case, the employees do appreciate and cooperate with the medical department and it has been responsible for a considerable decrease in absenteeism and has also helped the morale of our employees". . . . Experience in Canada has shown that cafeteria service in plants employing more than 300 workers is practical if the meals and prices are planned to appeal to at least 150 people. In a recent report, General Engineering Co. Ltd., Toronto, explains that its facilities for eating are provided as a service for the workers, that attractive meals are produced on a basis of scientific knowledge of nutrition and sold at attractive prices. Success of the service is measured by the proportion of the workers who eat the meals. Two hot meals and one salad plate meal are offered at 35 cents or 25 cents per meal. The service is assisting the war effort.

—From "There's Money in It," by JAMES MONTAGNES, in *Canadian Business*, August.

In War or In Peace

THE prevention of ailments, incapacities, and accidents and, having occurred, their cure, have always been the aims of the medical profession. These common objectives, applying in every field of medical endeavor, are likewise the goal of the industrial health and hygiene program in Illinois. There is no essential difference between such a program in war or in peace. The war has simply acted as a catalyst in bringing together all the various forces and agencies concerned in the vital conservation of manpower to the end that the highest possible efficiency of industrial production be attained for the war effort. Let us hope that sufficient momentum will accrue so that the lessons learned, the improvements developed, and the advantages gained in the promulgation of the workers' welfare during the war, will not only be retained but even augmented in the peace to follow. For sound industrial health and hygiene measures not only enhance the welfare of the worker; they are "good business" for industry; and they are good for the community.

—From the Report of the Illinois State Medical Society's Committee on Industrial Health, FREDERICK W. SLOBE, M.D., Chairman, *Illinois M. J.*, July.

Kickbacks

RECENT scandals over medical "kickbacks," as brought out in a New York State investigation of the administration of the workmen's compensation law, have inspired a charge that such irregularities are a result of "attempts at bureaucratic regulation of the medical profession." Edward G. Griffin, who was instrumental in drawing the present state medical practice act, declared in *The New York Times*: "There will always be scandal and inefficient policing while physicians and surgeons are allowed to regulate themselves through their own membership. Discipline of the licensed professions should be taken over by the courts, as in the case of lawyers. In the case of physicians, veterinarians, etc., each profession is tried before a grievance committee of its own profession, subject to review, on conviction only, by the Appellate Division. The accused under such a system is at a great disadvantage. A board of doctors has few qualifications to pass on evidence or the law." During testimony on "kickback" abuses in the x-ray field, doctors pointed out that they must study 10 years to be qualified to read x-rays and report on them, whereas technicians employed by x-ray concerns, who get the same fees, need have only a knowledge of anatomy. The secretary of an eye specialist testified that pad-

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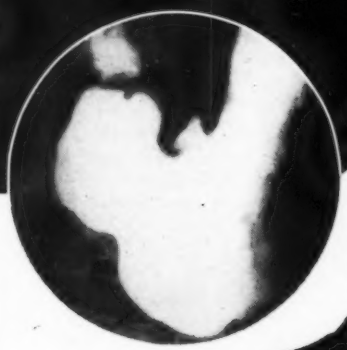

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Clinical response to Magmasil sets a new high standard in the treatment of peptic ulcer, gastritis, hyperchlorhydria. Since it is free from the drawbacks of many other antacid medications, Magmasil therapy is marked by dependable patient cooperation.

Magmasil cannot lead to alkalosis, to chloride depletion, to constipation. In the dosage employed, it exerts no influence whatsoever on intestinal motility.

Since its profound neutralizing power (86 cc. of N/10 HCl per teaspoonful) is exerted over fully four hours after ingestion, fewer doses are needed, and pain and pyrosis do not recur. The customary eleven o'clock dose usually holds the patient comfortable through the night.

Because of its high protective action Magmasil leads to rapid remission and unimpeded healing.

Physicians are invited to send for samples and a complimentary copy of the brochure "Twenty Years of Progress in Ulcer Therapy."

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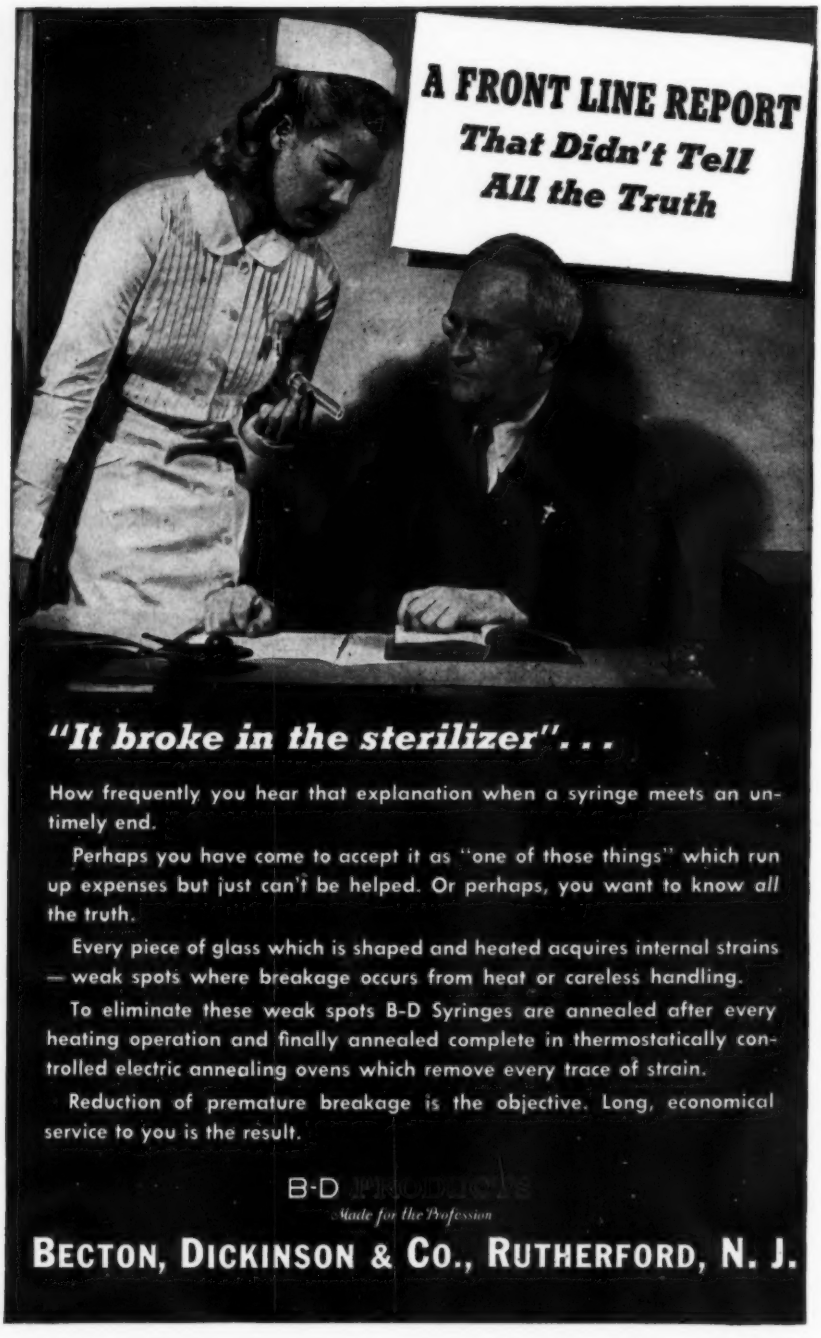
GASTRIC HYPERACIDITY...
ACUTE AND CHRONIC GASTRITIS

Magmasil is available through all pharmacies in 12 oz. bottles.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That Didn't Tell
All the Truth
"It broke in the sterilizer"...
How frequently you hear that explanation when a syringe meets an untimely end.
Perhaps you have come to accept it as "one of those things" which run up expenses but just can't be helped. Or perhaps, you want to know all the truth.
Every piece of glass which is shaped and heated acquires internal strains — weak spots where breakage occurs from heat or careless handling.
To eliminate these weak spots B-D Syringes are annealed after every heating operation and finally annealed complete in thermostatically controlled electric annealing ovens which remove every trace of strain.
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ding of bills to insurance companies in compensation cases was "a matter of course." She told of two patients with eye injuries, one of whom was treated five times and the other 12 times. Their bills, she said, called for fees for 23 and 24 visits. Several x-ray specialists admitted at the hearings that they had paid "kickbacks." They said their business would have dropped off alarmingly if they hadn't. They objected to the word "kickback," preferring "rebate" or "fee-sharing." One witness persisted in claiming that the payments were "assistance fees," given to other doctors who sent cases to him. These other doctors, he said, earned 50% of the fee by sending patients to him and telling him what was wrong with them. Meanwhile, the five county medical societies in New York City are pondering the cases of some 1,275 physicians named as "kickback" recipients. Dr. David J. Kaliski, representing the New York State and county medical societies, said each society would review the cases of its own members. "The medical societies are more interested in eliminating the practice than in hanging the doctors," he said; but he pointed out that in cases where disciplinary action is recommended the physicians face reprimands, suspensions, and expulsion from the panel of doctors authorized to treat workmen's compensation cases. Editorializing on the "kickback" evidence, the *New York World-Telegram* said: "While medical societies have long frowned upon fee-splitting, they have sometimes taken a rather reluctant and gingerly attitude toward actually applying the principle of disciplinary action to specific cases."

—*Medical Economics*, August.

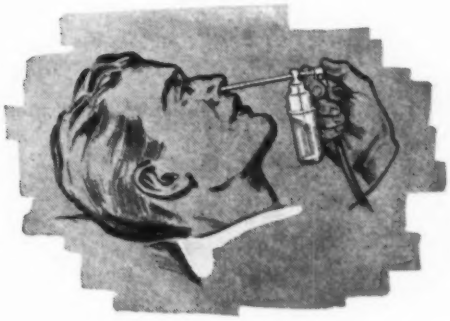
Protection for Welders and Burners

ALTHOUGH the health of welders is, in general, good, there are some health hazards associated with welding, and those may be minimized by proper precautions. . . . *Eye Irritations.*—Flying particles of slag or hot metal, and welding rays may irritate the eyes. Such injuries can be largely prevented by using the proper type of goggle. Safety goggles will protect the eyes from flying particles. Colored glass will prevent "flash burns." These colors have been standardized, and shades recommended for particular types of work are commercially available. The lighter shades protect from occasional indirect exposures, but will not protect from the direct glare of a welding arc. These should be worn underneath the welders' hoods, to afford protection while inspecting welds. The higher shades are used in welding helmets and goggles to protect the eyes from direct exposure while burning or welding. Metal or canvas shields should be provided around welding operations wherever practicable, and care should be taken not to weld while an unprotected worker is facing the arc. *Burns.*—Welding rays may cause an artificial sunburn. This may be prevented by protective clothing and helmets. *Metal Poisoning.*—Zinc fumes from welding on galvanized iron may cause metal-fume fever; lead fumes from lead cutting, or burning of lead-painted metal may cause lead poisoning. Metal poisonings can be prevented by local exhaust equipment so constructed as to remove the fumes at their source (exhaust openings must be placed within a few inches of the operator), and by the use of approved metal fume respirators or air line respirators. *Gas Poisoning.*—Gases produced by the arc or acetylene torch may cause injury, but this ordinarily occurs only when welding is done in an enclosed space. Under such conditions an airline, or air-supplied, respirator should be worn by the welder, unless adequate exhaust and ventilating provisions have been made.

—From "California Committee on Participation of the Medical Profession in the War Effort," in *California & Western Medicine*, August.

Under Control

DEVELOPMENT of the North African campaign made health and medical problems less complicated than had been anticipated. It had been feared that the severe bombardment of Axis forces in Tunis might create a serious health problem through destruction or damage to the water supply and sewage disposal systems of the city. Yet, so precisely had Allied bombers concentrated on the harbor area that only minor damage of this type occurred in the city and fears that typhoid and dysentery might become serious in Tunis and spread to other areas were promptly dissipated by rapid repairs effected by military engineers. Likewise, typhus, the louse-borne disease which readily



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without appreciable local irritation or
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Available as a 0.6% solution in a buffered approximately isotonic vehicle in 1 oz. bottles with dropper for prescriptions, and in 16 oz. bottles for office and hospital use.

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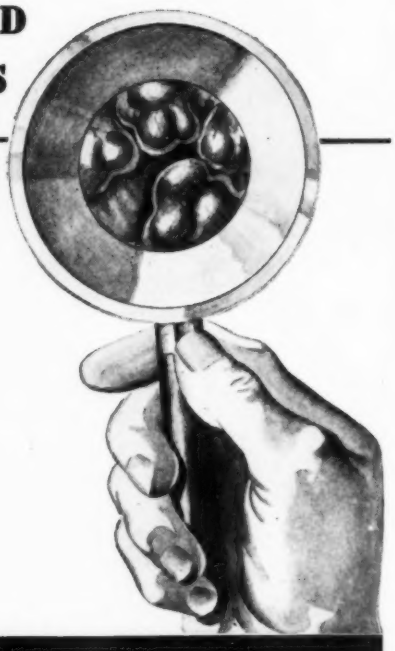
CONTROL OF PAIN AND PRURITUS *in* HEMORRHOIDS AND SKIN CONDITIONS



Soothing, cooling and analgesic, Nuzine Ointment provides welcome relief and offers local protection for painful, itching or burning lesions.

Well-established in hemorrhoid therapy, Nuzine Ointment has also been found quite effective in a variety of dermatologic lesions.

Let us send you samples for trial.

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Available in 1-oz. collapsible tubes with hard rubber applicator at $4.00 per dozen; 1-lb. jars at $1.50.

FORMULA:

Guaiacol	1.66
Oxyquinoline Sulphate	0.42
Zinc Oxide	2.50
Glycerine, C. P.	1.66
Lanum (Anhyd)	43.76
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assumes epidemic form in the uncleanliness of battle conditions, had been feared because it was known that only the year before there had been close to 25,000 active cases in the region. Yet, this year, only a few scattered cases were reported in all of Tunisia. It was assumed there would be some damage to hospital facilities, but in Tunis the hospitals were found intact with 1,000 empty beds. Although some of the other Tunisian cities, such as Bizerte and Sousse, had received rougher treatment, the public health officers reported in general after the campaign that health conditions throughout the area were normal in virtually every respect. Captured atabrine was on hand for the malaria cases and sulfa drugs were made available from military stores to make good the two most serious deficiencies in medical supplies. First aid stations for air raid casualties were found to be adequate.

—Department of State release.

Mouth Manifestations

A LARGE percentage of general diseases have mouth manifestations. Among these diseases may be classed the blood dyscrasias, such as anemia and leukemia; the acute infectious fevers, such as scarlet fever, diphtheria and measles; the drug and metal and chemical poisons, such as bismuth, mercury, phosphorus, benzene and lead; the digestive diseases, such as gastritis and jaundice; diseases of the glands of internal secretion, such as acromegaly and Addison's disease; diseases of the nervous system; vitamin and dietary deficiency diseases, and many miscellaneous types of disease. In a paper written in 1916, I named more than 75 such diseases with mouth manifestations and pointed to the fact that, in a large percentage, the manifestation in the mouth is the first indication of such diseases. This is notably true of occupational metal poisoning. A competent dental department is able to detect the oral manifestations of many of these diseases long before the employee notices the systemic symptoms which lead him to consult the medical department. Referring such cases to the physician for treatment at such an early stage will result in the prevention of much disability. In instances of occupational disease, a warning to the safety department will result in early preventive measures.

—From "Mouth Infection in Industrial Workers," by EARLE H. THOMAS, M.D., D.D.S., L.L.B., in *J. Am. Dental Assoc.*, August 1.

Doctor First

THERE is a growing conviction and demand on the part of the many forces who represent medical personnel that they be administratively responsible to top management and not to a personnel department. I think we can throw some light on this subject, which has too often simply generated heat, if we point out that the difficulties in any given situation are likely to be caused by a confusion of thought on the difference between administration and function. It is when the lay administrator assumes functional capacity in medical activity that difficulties arise which are usually erroneously explained away as being "personal." The doctor employed in industry differs from all other employees. The personnel manager, the safety engineer, the industrial relations manager, and all other executives belonging in industry are an integral part of industry and, even though they change their capacity, they remain in industry. They are children of industry. The doctor was a physician before he became "plant doctor," and if he changes his employment he drops the "plant" from his title and returns to the community as a doctor. It is this primary loyalty as a disciple of Hippocrates which has many times caused friction. When the doctor respects the administrative rights of the executive and the executive in turn respects the professional code of the doctor, the managerial level of administration becomes not quite so important.

—From "Present Day Influences in Industrial Health," by CHRISTOPHER LEGGO, M.D., in *Ohio State M. J.*, June.

Washington's Health

A THREAT of serious epidemics hangs over Washington, says a special Congressional subcommittee which reports the crowded capital as being dirty, vice-ridden, and susceptible to various communicable diseases, with half the population housed in insanitary, squalid slums. The subcommittee found that: Syphilis and gonorrhea among soldiers increased 147% in the last half of last year. Meningitis cases in the first three months of this year tripled the number recorded in the same quarter of last year. "A potent threat

To Prevent or Eliminate Infection in *Industrial Injuries*

Azochloramid preparations have proved valuable in treating the traumatic wounds of industry as well as those encountered among our armed forces. The reduced healing time and shortened period of hospitalization effected by prompt control of infection is a welcome contribution to greater industrial efficiency. The various forms of Azochloramid provide ready adaptability to the task at hand.

For antiseptic dressings and packings that remain moist

SOLUTION OF AZOCHLORAMID IN TRIACETIN 1:500

For direct application to granulating wounds

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For lavage, wet dressings, hot soaks and compresses

SOLUTION OF SALINE MIXTURE OF AZOCHLORAMID (aqueous, prepared from powder or tablets)

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Azochloramid preparations are *Bactericidal*

—to all types of micro-organisms

—in dilutions non-toxic to tissue

—over prolonged periods

—in the presence of pus and necrotic tissue

They are the most stable of all chlorine bactericides

They are strongly deodorant

Available through your usual source of supply

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"In our plant hospital we have used the 1/500 solution in triacetin, routinely in wounds as a prophylaxis against infection. After two and one-half years of experience, we are convinced that in any raw surface where infection is threatened, or even possible, the daily dressing by gauze moistened in the above preparation is a sure guarantee against suppuration. This insures healing per primum, and lessens both temporary and permanent disability."

Antiseptics and Their Action, R. M. Freeman: *Industrial Medicine*, February, 1940.

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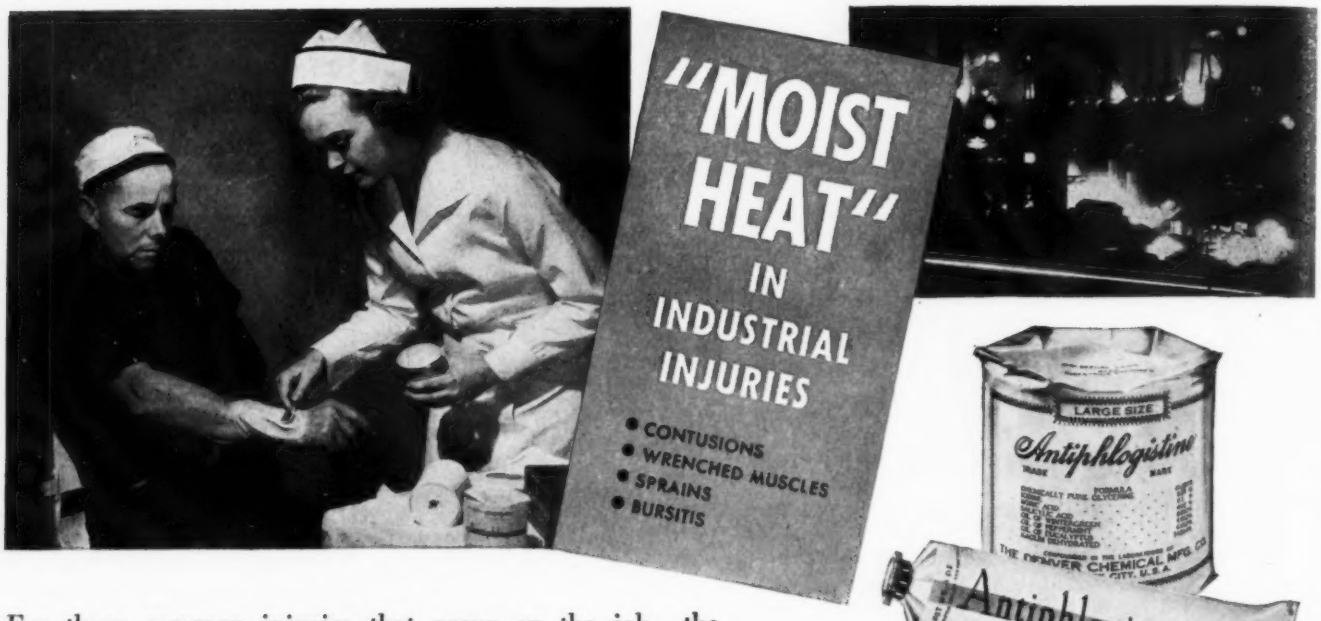

For those common injuries that occur on the job – the "Moist Heat" of an ANTIPHLOGISTINE pack brings immediate relief.

ANTIPHLOGISTINE is applied comfortably hot, directly to the injured area – in order to ease the pain, reduce the swelling and promote healing.

ANTIPHLOGISTINE is a ready-to-use Medicated Poultice. It maintains moist heat for many hours.

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Formula: Chemically pure Glycerine 45.000%, Iodine 0.01%, Boric Acid 0.1%, Salicylic Acid 0.02%, Oil of Wintergreen 0.002%, Oil of Peppermint 0.002%, Oil of Eucalyptus 0.002%, Kaolin Dehydrated 54.864%.

The Denver Chemical Mfg. Co., New York, N. Y.

of a typhus epidemic" lurks in the fact that typhus germs have been found on D.C. rats. "Very active" tuberculosis cases have turned up among arriving workers. A prevalence of malaria-carrying mosquitoes is made the more ominous by a shortage of quinine. Crowded housing conditions accentuate the danger of quickly-spreading respiratory diseases similar to the influenza outbreak during World War I. Revelation that half the capital's population lives in a three-mile-square slum area, containing 40% of the district's structurally defective buildings, "astounded" the subcommittee. The fact that 900 Washington dwellings were found dependent on outdoor privies, with no sewer connections, added to its dismay.

—*Medical Economics*, August.

Undiscovered Tuberculosis

WE KNOW from mass surveys in Erie, Philadelphia, New York, and elsewhere that there is a great pool of undiscovered tuberculosis awaiting our attention. The instrument that has proved this to us is the x-ray. It is axiomatic that the more physical examinations one performs, the more tuberculosis will be discovered. But in many Pennsylvania industries surveyed by individuals and by the State Bureau of Industrial Hygiene we find there are no physical examinations, no pre-placement medical studies at all. The majority of factories employing 1000 or more people do practice routine physical examination, but I can still show you organizations with 4000 employees that do not. When we turn to the smaller groups, the lack of medical attention becomes more glaring—until finally we can say that only the very exceptional plant with 50 to 100 employees has a medical program. These surveys have shown that also that 92 out of every 100 industries in this state employ less than 100 people; that is, for every eight plants, where we are liable to find a medical department, there are now 92 completely without such service. . . . BECAUSE the best defense is a successful attack tuberculosis is on the increase. I have actual proof for that statement. In 1941 I examined 3226 persons for employment, of whom 5.2% had some form of pulmonary tuberculosis. In 1942 the percentage rose to 5.6%, and in the first three months of 1943 it has jumped to 7.5%. Even more ominous are the following figures: In 1941 only 4% of those found tuberculous had lesions of clinical significance. In 1942 these lesions rose to 11.6%. So far in 1943 they have reached 16.2%. Translated into one sentence this means we are seeing more, and more serious, pulmonary tuberculosis than before the war.

—From "The Accomplishments and Aims of the Medical Society of Pennsylvania in Industrial Health," by CHARLES-FRANCIS LONG, M.D., in *Pennsylvania M. J.*, June.

"The Facts"

ONE in every 10 cases of blindness in this country is caused by syphilis. One in every eight deaths from heart disease is caused by syphilis. Thousands of people in our mental institutions were put there by syphilis. Gonorrhea cripples. And it destroys the chances of both men and women for having children.

From "What You Don't Know CAN Hurt You," U. S. Public Health Series; Workers' Health Series—No. 10.

The Older Worker

GERIATRIC medicine has much to offer industry. Industry, likewise has much to offer geriatric medicine through the lessons learned and from the studies made upon older employees. A closer liaison between internists aware of the potentialities of constructive geriatrics and industrial health officers can but rebound to the advantage of both fields. A few of the more significant concepts may be emphasized in summary. The objective of geriatrics is not merely to prolong life but to add breadth and depth to the dimension of length, to prolong vigor and usefulness. Longevity without health is not only a personal tragedy but a serious threat to national economic equilibrium. Mortality tables may be sadly misleading. Let us not be too complacent over the extension of the life expectancy, for the heavy toll of prolonged disability exacted by the insidious and progressive disorders

YOU CAN'T RUN AWAY FROM COLDS

. . . BUT YOU CAN SOMETIMES DODGE THEM!

• Since immunologic responses to the so-called cold virus are relatively transient, prophylactic and therapeutic measures are directed toward active immunization against the secondary, *bacterial* invaders characteristically present in the nasopharynx.

'Vacagen' Oral Cold Vaccine Tablets are designed to produce active immunity against bacteria considered responsible for the more severe manifestations of colds, grippe and similar acute infections of the upper respiratory tract. These enteric-coated tablets should prove exceptionally effective because they provide *soluble antigens*, not dead bacteria.

Immunization against colds may be established by oral administration of one tablet daily, on an empty stomach, for eight successive days.

Established immunity generally may be maintained by administration of one 'Vacagen' tablet once or twice weekly.

Each tablet contains the water-soluble antigenic substances extracted from 60 billion pathogenic organisms, as follows:

Pneumococcus* (*Diplococcus pneumoniae*)	25,000 million
Streptococcus**	15,000 million
Influenza bacillus (*Hemophilus influenzae*)	5,000 million
M. catarrhalis (*Neisseria catarrhalis*)	5,000 million
Friedlander bacillus (*Klebsiella pneumoniae*)	5,000 million
Staphylococcus aureus	5,000 million

*Types 1, 2, 3.
**Hemolytic, non-hemolytic and viridans.

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*Schwartz, L., Med. Dir., U. S. Public Health Serv.: Manual of Indust. Hygiene, 1943, p. 174.
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of later maturity is a sociologic question of great urgency. Personal preventive medicine, if properly applied, can do much to conserve health in later life. It must be highly individualized in both diagnostic study and therapeutic regimen to be effective. Senescence and the degenerative disorders of the senescent period start far earlier than their symptoms become apparent. These disorders must be searched for if they are to be directed early enough to accomplish much in the way of prevention. Through thorough pre-employment and periodic examinations, industrial medicine can serve the whole Nation by detecting degenerative disorders early and insisting upon control by adequate medical care. The practices of health conservation among older personnel should start at the top. We must not forget that the wisdom of older men in positions of greatest responsibility represents an invaluable national resource. The maintenance of the health, and therefore of the efficiency, of these precious individuals is a distinctly significant part of the war effort. These more mature minds are not only responsible for the winning of the War, but will be given the responsibility of the winning of the Peace.

—From "Health Problems of the Older Worker," by EDWARD J. STEIGLITZ, M.D., F.A.C.P., in *Trained Nurse & Hospital Review*, September.

Sickness Rates Higher

IN A FORTHCOMING paper, "Sickness Absenteeism Among Male and Female Industrial Workers, 1933-42," based on eight-day cases or longer, DR. W. M. GAFAFER reports, among other things, that the male rate of 106.1 absences per 1000 for 1942 for all causes is the highest recorded annual rate since 1933 and is 16% greater than the 10-year average of 91.1. The female rate of 168.4 for 1942 for all causes is also the highest recorded annual rate since 1933, being almost 60% greater than the corresponding male rate and 14% in excess of the 10-year average of 148.1. For the males each broad sickness group for 1942 shows a rate that has never been equalled or exceeded since 1933, while for the females only the non-respiratory-nondigestive group is so characterized. There are certain specific causes for males which show for 1942 the highest rates for the 10-year and at the same time yield relatively high excesses when compared with the corresponding averages for 1933-1942. These causes with their excesses are pneumonia, 83%; bronchitis, 44%; and diarrhea and enteritis, 38%. The corresponding causes for the females are diseases of the organs of locomotion except diseases of the joints, 85%; pneumonia, 81%; and nerasthenia, 41%.

—*Industrial Hygiene*, August.

Collective Bargaining re Health

ON AUGUST 27 and 28, the United Auto Workers' (CIO) Medical Research Institute held a conference in Detroit attended by the Institute's Advisory Council, the staff of the Institute, and about 60 delegates of affiliated local unions. The purpose of the conference was to acquaint the local unions with the recently enlarged program of the Medical Research Institute, and to secure advice from the Advisory Council, which met for the first time with the union's local representatives. The Medical Research Institute has been established by the UAW to provide medical examinations to members referred by local unions for special reasons, including exposure to dusts, fumes, vapors and gases; skin diseases; complaint of ill health due to working environment; dispute of findings of plant physicians; and refusal for employment on account of alleged physical disability. In addition, the Institute staff is preparing a comprehensive plan for education of members on health and safety, and developing a rehabilitation program to assist handicapped and disabled members to secure suitable jobs. In carrying out this program the Institute has secured for its Medical Advisory Council the following persons: DR. DEAN A. CLARK, DR. LOUIS SCHWARTZ, and J. J. BLOOMFIELD, U. S. Public Health Service; DR. MICHAEL M. DAVIS, Chairman of the Committee on Research in Medical Economics; DR. EMERY R. HAYHURST, Consulting Industrial Hygienist; DR. KINGSLEY ROBERTS, Medical Administration Service; and DR. HENRY E. SIGERIST, Johns Hopkins University. The program of the conference included discussions by the officers of the International Union, R. J. THOMAS, President, and GEORGE F. ADDES, Secretary-Treasurer; and by members of the Advisory Council—DR. HAYHURST, DR. SCHWARTZ, DR. CLARK, and MR. BLOOMFIELD. Delegates from local unions presented brief talks on the health problems which their respec-

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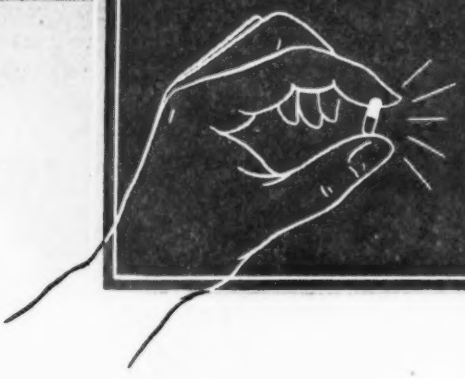

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†Snyder, R. G., Squires, W. H. and Forster, J. W.: Indus. Med., 12:291-297, (May) 1943

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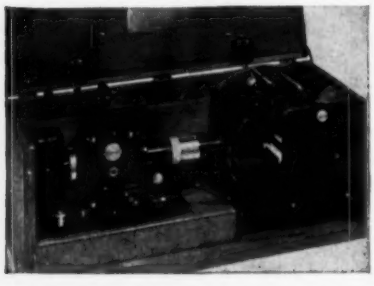

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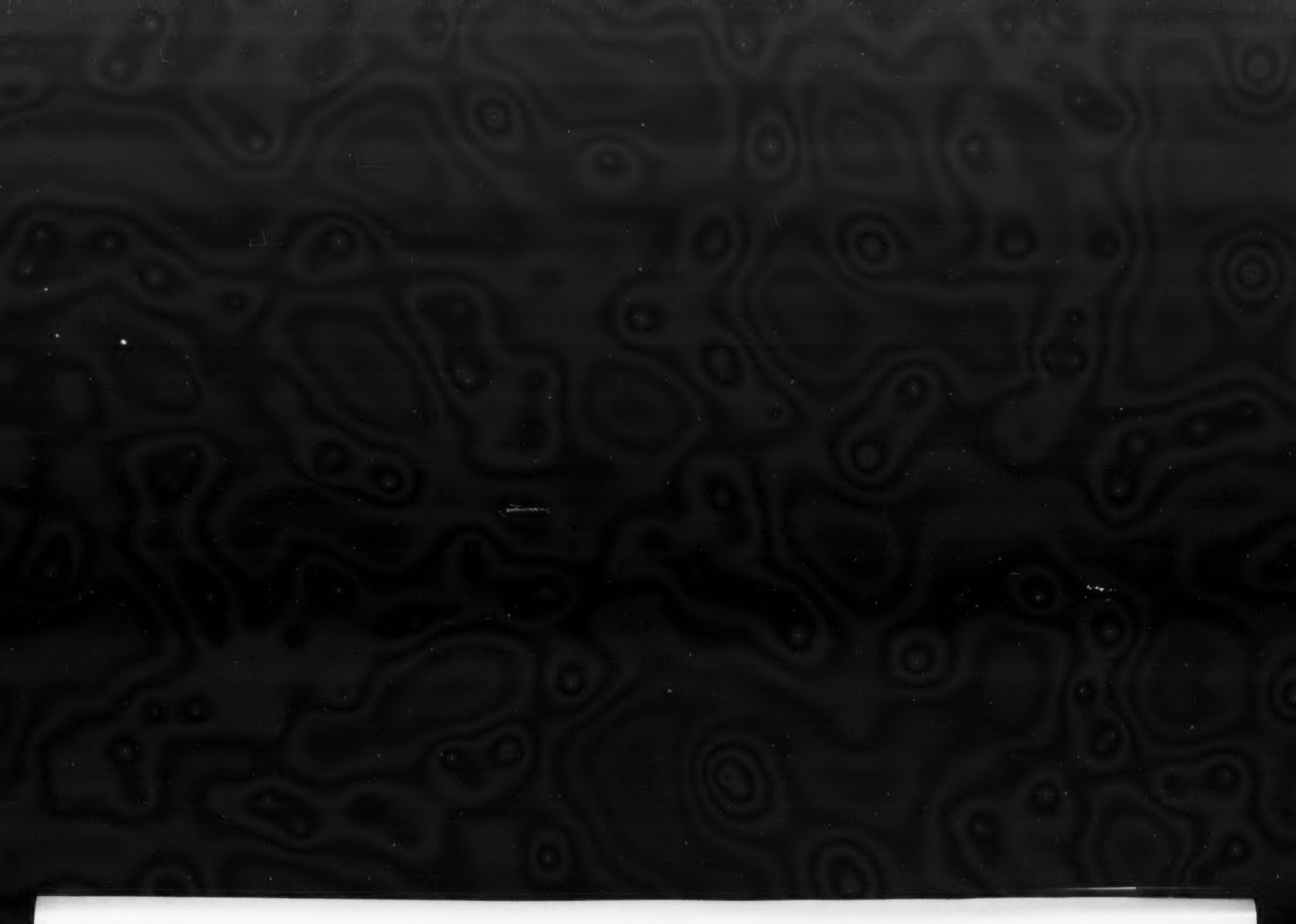
tive unions found in the factories where they are employed. MR. THOMAS outlined the program for health and safety to be recommended for inclusion in collective bargaining contracts. He indicated that there has been a steady increase in the number of UAW contracts which contain first aid and sanitary provisions. In 1942, 38% of the total contracts included health clauses. "The real difficulty," he stated, "is the refusal of managements to consider health, safety and compensation a proper matter for collective bargaining. Too many corporations take the position that these are matters over which they have exclusive right—and most frequently they insist on this right only to neglect it." He continued, "Our union, and I hope many other unions will soon follow suit, is determined to make these questions a matter for joint responsibility. . . ." MR. BLOOMFIELD, in his discussion of "Workers' Participation in a Health and Safety Program," stated that it was the policy of the Division of Industrial Hygiene of the National Institute of Health to recommend that the unions work with the management in bringing about desired improvements and cited some instances in which labor-management cooperation would have been a more appropriate action than the course taken in handling emergency health problems. In one of these cases a threat to strike was the means used to bring action on the part of management. He especially

—*Continued on page 704.*

TEN YEARS AGO

DR. NATHAN S. DAVIS, III, in "Cardiovascular Disease and Industry," INDUSTRIAL MEDICINE, October, 1933: "The industrial physician must depend to a large extent on history and physical examination in making his decisions with respect to cardiacs; the instruments of precision and special tests, so far devised, assist him in the making of accurate diagnoses but do not make the diagnoses for him. His diagnosis will not be accurate if he knows only about the working conditions of the cardiac. He should also obtain information about his home life which can often be obtained more easily with the assistance of a social worker or better of a registered nurse who has had special training in social work. In this way he will get to know the individual more as does a family doctor and as a result will be able to make decisions that are more just than if they depended only on the story as told by the patient, the objective findings and the result of laboratory or clinical tests. Prognosis in heart disease and the prevention of heart failure are of great importance to the physician in industry. Prognosis cannot be accurate without a complete diagnosis and cannot be accurate if dependent only on clinical and laboratory tests. The development of cardiovascular disease or of heart failure cannot be prevented, no matter how good the conditions in an industry may be, if the conditions when the employee is off duty, are not proper."

DR. A. W. SCHOENLEBER, in "Industrial Health Programs," INDUSTRIAL MEDICINE, October, 1933: "In the United States one of the earliest industrial medical services was that inaugurated by textile mills at Lowell, Massachusetts, about 1840. It was part of an extensive welfare program stimulated, no doubt, by labor troubles and put into effect by progressive employers who wished to remedy some of the deplorable working conditions which then existed. The plan included a hospital and a professional staff which provided complete medical service for employees. There is no indication that doctors had any supervision within the factory or that they took any action to prevent occupational diseases. It is of interest to note that this, the first recorded effort of organized industrial medicine in the United States, consisted of a mutual benefit plan by which employees received complete medical and hospital service; also, that the plan was operated in an established community where one might assume that other hospitals and medical facilities were available. There is no evidence that this movement extended to other industries at that time. In fact, the project itself was discontinued after a few years of operation."



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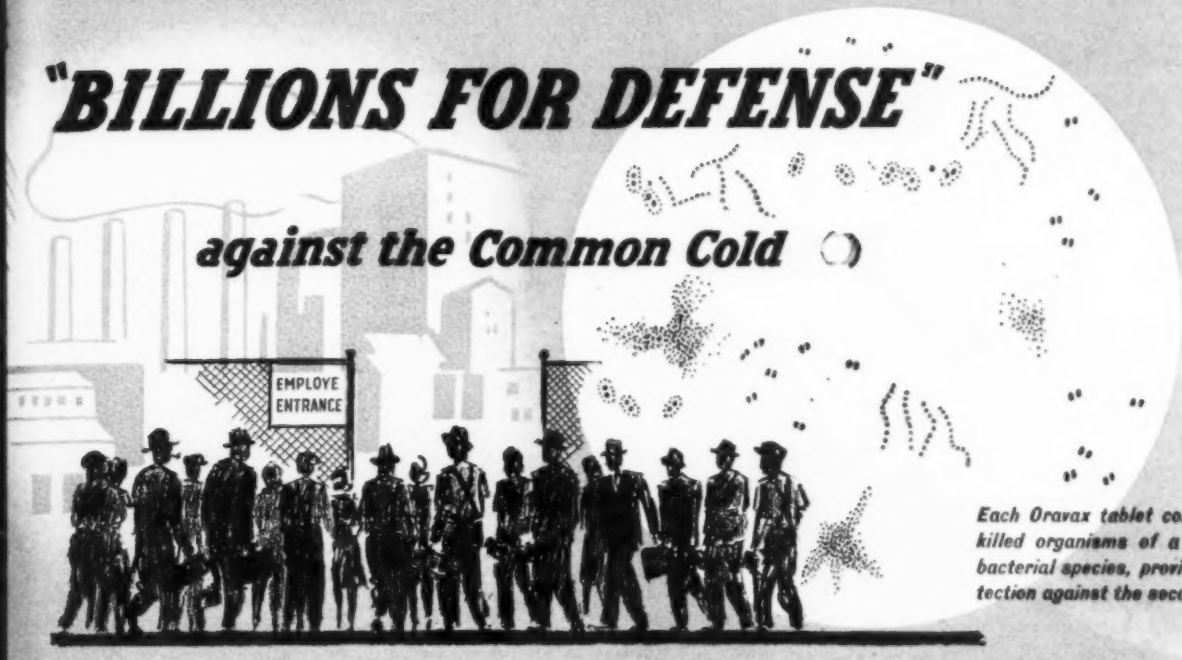

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Business is at War... and man-hours of working time are the very essence of victory. The incidence, severity and duration of the common cold—greatest single cause of disability—can be definitely reduced by the Oravax program of colds protection.

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> Complete freedom from colds in 81.92% of Oravax group; 12.34% of control group.
>
> J. M. A. Georgia *28:* 332-334 (1939)

> Number of severe colds and total days' illness from severe colds in Oravax group only one-fifth that in control subjects.
>
> Journal-Lancet *60:* 319-324 (1940)

> 70.2% decrease in number of colds in group receiving Oravax; 7.2% decrease in group given placebos.
>
> Indust. Med. *9:* 530-533 (1940)

Oravax is inexpensive, painless, free from severe reactions. Suggested dosage is one tablet daily for 7 days; then one tablet twice weekly throughout season when colds are most prevalent.

Oravax is available at prescription pharmacies in bottles of 20, 50 and 100 tablets. Large-scale vaccination of industrial groups may be accomplished more economically by purchasing the tablets in bulk packages. Write for complete details of the Oravax program, including clinical reports and a cost estimate covering vaccination of the group under your care.

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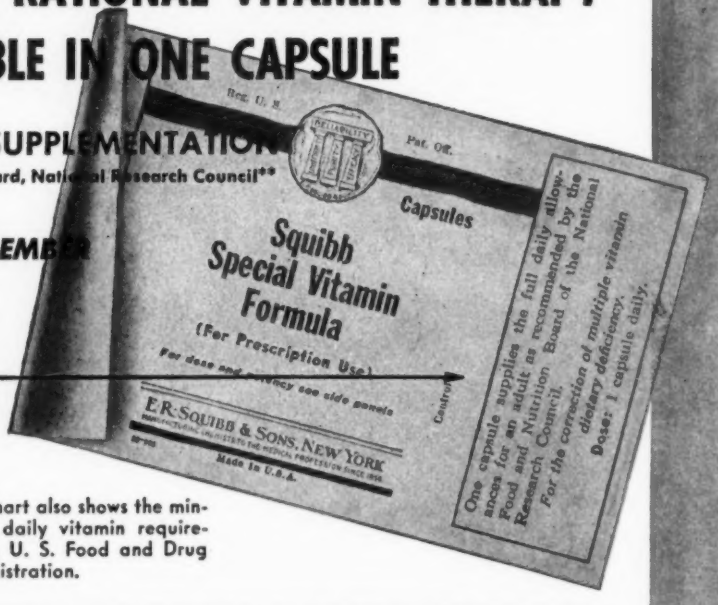
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One capsule supplies the full daily allowances for an adult as recommended by the Food and Nutrition Board of the National Research Council.
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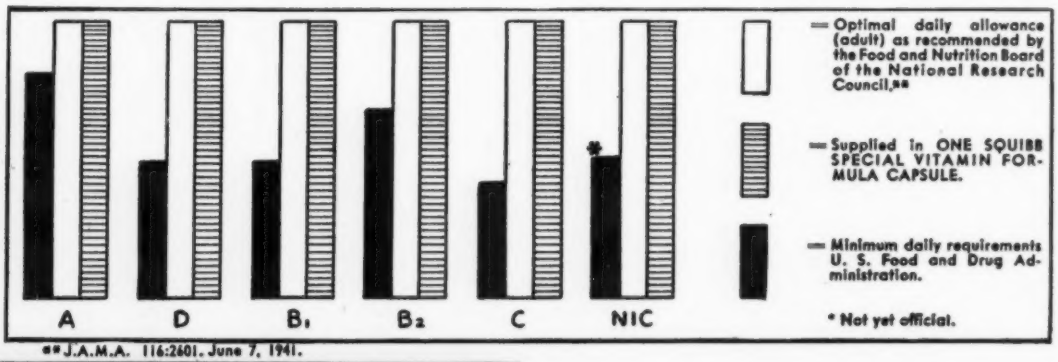
This chart also shows the minimum daily vitamin requirements, U. S. Food and Drug Administration.



= Optimal daily allowance (adult) as recommended by the Food and Nutrition Board of the National Research Council.**

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** J.A.M.A. 116:2601, June 7, 1941.

... and for severe deficiencies of the water-soluble vitamins

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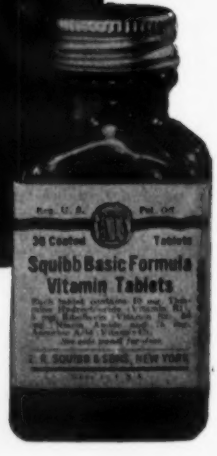
VITAMIN TABLETS



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This formula is now available to all physicians as Squibb Basic Formula Vitamin Tablets.

[1] Jolliffe, N., and Smith, James J.: *M. Clin. North America* 27:567, March 1943.
[2] Spies T. D.: *M. Clin. North America* 27:273, March 1943.
[3] Spies, T. D.: *J. A. M. A.* 122:497, June 19, 1943.

This magazine is published to promote sound thought upon and concerning industrial medicine and traumatic surgery. To that end it will contain articles, news items, reports, digests, and other presentations, together with editors' comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited.

Industrial Medicine

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The editors will exercise care in checking on the accuracy of data printed, but in all other respects articles and opinions of which expression is allowed are the opinions of their authors—the editors reserving in all cases the right to comment on the same, in the current or any subsequent issues, as they may be inclined.

The Journal of Industrial Health, Occupational Diseases and Traumatic Surgery

With which are consolidated "The Industrial Doctor" and "International Journal of Medicine and Surgery."

The Science, the Law and the Economics of Industrial Health

Volume 12 | October, 1943 | Number 10

Plant Physician and Safety Engineer

—And the Cooperation Between Them—

CHRISTOPHER LEGGO, M.D.,
Industrial Hygiene Physician, Ohio Department of Health, Columbus, Ohio

IN PRESENTING the subject "Cooperation Between the Plant Physician and the Safety Engineer" we must stipulate that many of the statements are made in the form of generalities, and that practically no generality regarding human beings and affairs can be accepted as always true.

To begin with we should consider the basic differences between the safety engineer and the industrial physician. They have a common origin, the compensation law. The first of these laws to prove constitutional in the United States was passed in 1911, and then they multiplied rapidly so that they were a common pattern by 1916.

These laws resulted in the birth of the safety engineer from the womb of industry, and his object was to prevent accidents. These laws also caused the employment of the plant doctor, but he was not born in industry, he was a community doctor converted into an industrial physician.

This differentiation from the point of view of the development of the industrial doctor and the safety engineer is important. It emphasizes that the industrial physician is a doctor first and in the event he changes his capacity he usually returns to the community as a physician. The safety engineer is usually recruited from industry and if he changes capacity he is still likely to remain in industry. This latter statement is true of most of the other personnel of whom we think in connection with the setting of the industrial stage. The physician is distinctive in being the follower of a code which dates back to Hippocrates, who lived 400 years before Christ. This, then, is the first generality which we must keep in mind; the code of the industrial doctor is based on standards 2,000 years older than industry as we know it, and his attitude is modified from those around him by old primary professional standards to which he consciously or subconsciously remains loyal. How to meet this attitude we shall discuss later.

The second point of difference is in the primary object of employment. The safety engineer was hired to prevent accidents. The results of each injury caused by an accident are of essential interest to him for use as educational material among his plant population to prevent recurrences of a similar accident. Prevention was the original motivation for employing the safety engineer. Restoration was the original motivation for employing the doctor.

The two philosophies were sufficiently opposite that a close cooperation was not inevitable. The early approaches to safety were experimental and there were numerous experiments in discipline, meted out on an individual basis, and often, to those who had already suffered physical injury, a financial penalty was superimposed.

The doctor was treating these same employees on a friendly physician-to-patient relationship and was establishing a friendly atmosphere with employees as a whole. He was charged with the treatment of all injuries and he accomplished this in such a way as to gain the regard of his plant employees.

The safety engineer at the same time was charged with the prevention of all accidents, a complete impossibility, and was likely to find he had alienated himself from the regard of many in the plant in his efforts to accomplish the impossible. Fortunately there has been a gradual change, real and demonstrable, in the attitude of both the doctor and the safety engineer in the past few years.

THE doctor began to develop an interest in other phases than the cure of traumatic injuries. He has not, fortunately, done this at the expense of accident care. This is still a primary responsibility and a basic one, and I hope we will not grow so ethereal that we will ever minimize the importance of curative medicine or surgery. These other responsibilities which the doctor has assumed are summed up in the term "overall health program." He has become interested in the general welfare of the employee, and no small part of this newer field is health education, and the industrial physician is now thinking in terms of *education and prevention* as well as of medical care.

The safety engineer, as we have intimated, resorted to trial and error in his approach to accident prevention. During th last few years he has realized that he cannot be responsible for the prevention of individual accidents, but can only be responsible for an educational program which teaches management, at all levels, and the employees themselves how to prevent accidents.

The safety engineer is now thinking in terms of *education for prevention.* We then have, today, the doctor and the safety engineer interested in the same thought: education and prevention among the same employees and with the same common end, health. Today is an opportune time to study the possibility of cooperation.

Presented at the Michigan Safety Congress, Detroit, May 19, 1943.

A background must be laid in any given situation. There must be no confusion between administration and function. When this occurs there is usually an environment of stress and strain, of jealousies and cross currents, which makes any mention of the word cooperation ironical. The lines of the administrative chart are not important, as such, as long as they clearly define the limits of administration. If the personnel department, the medical departemnt, and the safety department all have functional independence, then cooperation between the groups becomes more than theoretically desirable, it becomes readily and pleasantly practical.

The over-all educational program of the plant personnel can be correlated into one broad program. The trainee can be given a correlated course of training in which safety, health, hygiene, and first aid can be blended into a balanced syllabus, and there is no longer any excuse for a disorganized vaudeville presentation which loses impressiveness because of its obvious lack of inter-departmental cooperation.

It may be that cooperation is desired but, when attempted, cooperation just doesn't seem to "click." Let us do some mental "trouble shooting" to see what may be caught in the gears.

The first matter to check is the one which has been stressed: Are functional prerogatives being respected —or is someone trying to "run" someone else's program instead of cooperating with it?

The second question is: Are the lines of responsibility properly defined? Is proper differentiation made between the accidental injuries or occupational diseases of employees and those illnesses which may be classified as "personal?"

The doctor is in a strategic situation to obtain the information necessary for the safety engineer after an injury. He takes the first history, and it is the first story which is important. I know of no doctor who will deliberately set out to deny the safety engineer the history of an accident or necessary details of the injury received. It is when a doctor is approached for information concerning medical conditions other than those for which industry is responsible that he may show his teeth and growl, and, in his resentment, overcompensate by denying that which he should be willing to give.

This situation is also created when the safety engineer, directly or through another lay administrator, asks for the details on all medical cases and wishes to extract the accidental injuries from them.

The strong current demand, which each year becomes stronger from medical men and their representatives, is that medical records be the property of the medical personnel only. Where this is accepted they must cooperate by rendering to the plant lay personnel that portion of the records to which they are entitled, and this includes the accidental injuries and their histories.

Sometimes this situation is built up unconsciously by careless wording. It is always safe to ask "Is John Doe sick or injured through an industrial cause?" If the answer is "Yes," the safety engineer should expect, and receive the necessary details.

When the question is worded "What's the matter with John Doe?" the answer may be either evasive or framed to mean "none of your business." Actually the questioner only wished to know if John Doe was injured industrially.

If anyone has a personal or official interest in John Doe he will word his question, "How is John Doe?" Then, even if the sickness is personal, a personal answer may be readily supplied which will satisfy the questioner. "He is seriously sick," or "He is in the hospital," or "He'll be in next week fit for duty," supplies the necessary information.

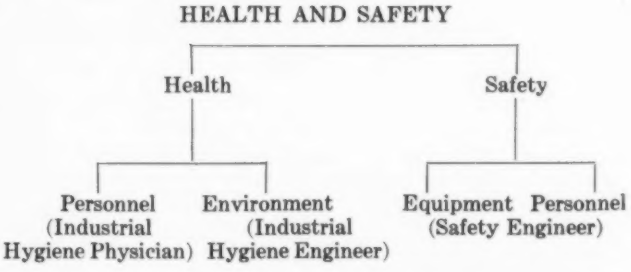
After all, there is certain basic information to which an employer is entitled and without which labor dispatching becomes impossible. If his efforts to obtain this information give the appearance of prying, it may be because the doctor does not supply him with these essential facts. A satisfactory plan can always be arranged whereby the employers needs are satisfied, the employees private rights respected, and medical ethics are not violated.

In my own experience I met this situation by using a form for each absentee which was sent to his department. It served a double purpose; it gave the supervisors and foremen the information which was required and it also demonstrated to the plant at large what information was common, and emphasized that all information other than this was private. It is to be understood, of course, that the details of an industrial accident or an occupational disease are not subject to the same restrictions, because it is a matter of good public health and safety in the plant that sufficient details be understood to allow preventive steps to be taken. The form was approximately as follows:

Department_____
Your employee_____ Work No._____
Is absent through: 1. Industrial accident _____
2. Sickness _____
3. Non-industrial injury _____
His condition is: serious_____not serious_____.
He is at: Home_____Hospital_____.
He is expected to return to work_____.
When he returns to work his condition will be: Well _____
Subject to light work_____days
Subject to recurrence_____

Statistical information and compilations should be available on a monthly or quarterly basis which presents the picture of health conditions without revealing personal identification. As a matter of fact, where this information is complete, accurate, and well broken down, the finger will be pointed at many conditions which are subject to prevention or control.

References were made above to "health and safety." After all, these are the representative fields of the two groups of people whom we are discussing. I think we can diagram a home-made scheme which properly interprets the field of the plant physician, the safety engineer, and also that of the industrial hygiene physician and industrial hygiene engineer.



It will be noted that safety is broken down into equipment and personnel both of which constitute the field of activity of the safety engineer who, alone, is entirely responsible for this side of the chart.

The health side of the chart is broken down into two, personnel and environment. The responsibility of these items is divided: the industrial hygiene physician working with and from the point of view of the personnel, and the industrial hygiene engineer concerning himself with the environment.

It is not meant to imply that these compartments are watertight. They are simply meant to be described and understood as first bases from which those concerned should not stray too far, alone because of the danger of being caught off base in the territory of another. It would be an unfortunate industrial hygiene physician who expected to maintain or improve his position without increasing his understanding of environmental hazards and safety hazards. Similarly the safety engineer is still professionally driving a horse and buggy if he does not increase his knowledge and his interest in industrial hygiene hazards. Some problems he may master; others he can learn to recognize or suspect, but he must look to the industrial hygienist for their final solution. The plant doctor is concerned with the personnel on both sides of the chart, to restore those injured by accident and to protect those who are well from health hazards. I do not prophesy that the day will come when industrial hygiene engineering and safety engineering will be combined in one professional individual. It is not at all impossible that such will be the case. I do prophesy that confusion rather than cooperation will result unless it is recognized that the two fields represent separate functions today and call for separate training and ability. When this is realized the groundwork for cooperation is laid and history alone will tell whether cooperation is eventually replaced by amalgamation.

The third question is: Is mutual interest in both programs cultivated? This implies an establishment of good personal relationships to begin with, and the maintainance of these relationships by at least occasional conversations at a time when there is no acute trouble. If both the doctor and the safety engineer understand each other's program and the methods used by each they can be of inestimable help to each other. The safety engineer is constantly in contact with employees who are, or have been, or should be, under the care of the plant physician. He can frequently drop a word of suggestion or add a word of explanation which will improve the relationship and so aid the cure. Similarly the first aid is the natural place for many complaints about safety conditions or practices to be made. Its proper use as a clearing house for these remarks will lead to many a correction of safety conditions. The safety engineer will find the medical department a useful ally. Where there is a part-time or call doctor it is more important than ever. The safety engineer can do much to bring this doctor, too often a stranger, closer to the plant by his contacts with him and in arousing his interest in the plant and its condition.

The fourth question: Is there a recognition of those conditions which must be recognized as joint responsibilities which must be attacked by a team, and which neither the plant physicians or the safety engineer can solve singly? Cutting oil dermatitis is a classic example.

Fifth, and finally: Is there a recognition of those conditions which jointly may not be solved without assistance from other departments within the plant or from other agencies without the plant?

In conclusion let us remember that the lives and happiness of all employees are affected by a large number of variable conditions which can be collectively added up in terms of "human values." These human values are the yardstick by which an employee measures his employers. Frequent injuries or diseases lower this human value rating. The plant doctor and the plant safety engineer raise this rating directly in proportion to the success with which they prevent injuries or illnesses. The more closely they cooperate with each other the greater is the accomplishment of each.

It is a striking observation that seldom will a plant be found which has a superior safety program but which tolerates dangerous health conditions, or *vice versa*. The "human values" balance sheet of an organization consists of many more items than health and safety. A very reliable clue, however, as to the emphasis placed on human values can be found in the atmosphere of the medical and safety departments; when a visitor is impressed with an atmosphere of cordial relations let him be prepared to find industrial relations throughout the plant equally cordial and friendly. In this way the cooperation which exists between the medical and safety departments of an industry can be used as a rough, but not too unreliable, gauge for the evaluation of industrial relations.

The Organic Industrial Solvents

—In Terms of Their Fire Hazards—

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WHILE the industrial physician is primarily concerned with the toxic hazards of the organic solvents used by industry, he cannot be indifferent to the losses due to the flammability of many of them.

The extent of these losses is indicated by figures compiled by the National Fire Protection Association.[1,2] During the past three years, flammable solvents in industrial and home uses were responsible for more than 60,000 fires in this country; and these fires killed about 3,000 persons, seriously injured many more, and destroyed property valued at nearly $15,000,000.

Relying on a statement repeatedly made in the medical literature, the industrial physician may feel that, when workers are protected from the toxic effect of the solvents, the fire hazard is also eliminated. But this is not necessarily true. Flammable-solvent vapors can catch fire or explode when all precautions for safeguarding health are being taken.

Hence, in passing upon the safety of solvents for various applications, their fire hazards under the conditions of use should also be taken into consideration. To assist in this, the accompanying table, showing the specific fire hazards of a number of organic solvents, has been prepared.

Evaluating the Fire Hazards

FLAMMABILITY RATINGS—The fire hazards of a flammable solvent depend upon several properties, chief among which are flash-point, volatility, ignition temperature, vapor density, and lower explosive limit. There are others that exert some influence, but these need not be considered here.

Giving each one of these properties its due weight, the Underwriters' Laboratories have determined the relative fire-hazardousness of the commonly-used solvents at ordinary temperatures and have given each a flammability rating, as shown in the first column of the accompanying table. With these ratings as a basis, the organic solvents can be classified as follows:

FLAMMABILITY RATING	CHARACTERISTICS OF LIQUID	EXAMPLES
0	No fire or explosion hazard	Carbon tetrachloride
1 to 20	Low flammability	Heavy lubricating oil
21 to 40	Moderate flammability	Kerosene
41 to 80	Hazardous	Ethyl alcohol
81 to 110	High fire and explosion hazard	Gasoline, ether

The flammability ratings provide a convenient means for appraising a solvent as a fire hazard, but, in addition, it is necessary to understand the significance of

the other data given in the table because, on occasion, any of the properties listed may be of predominating importance.[3]

FLASH-POINT—The flash-point of a liquid is the temperature at which it gives off vapor in sufficient quantities to form flammable, or explosive, mixtures with the surrounding air. In other words, it is the temperature at which the liquid becomes hazardous.

Thus, if a flame is passed close to the surface of ethyl alcohol when the temperature of the liquid is below its flash-point, 55° F, no ignition will occur; but, when the liquid is at a higher temperature, the flame will either set fire to the vapor being given off, or under suitable conditions, will cause an explosion.

Hence, liquids having high flash-points are relatively safe from casual ignition under ordinary conditions, but those with flash-points below 100° F are hazardous. Such liquids have been given flammability ratings above 40.

As mixtures of solvents are commonly used in industry, it is important to note that the flash-point of a mixture of flammable liquids may be lower than that of any of its components.[4,5] Therefore, the mere act of mixing solvents may increase their hazardousness, and the failure to realize this fact has led to serious incidents in industry. Before any solvent mixture is used, its flash-point should be accurately determined.

A non-flammable mixture can be prepared by mixing flammable and non-flammable solvents in the proper proportions, but, if the non-flammable component is highly volatile, it may evaporate out of the mixture, leaving a flammable residue. Using such residues in the belief that they are still non-flammable has also been the cause of many accidents. (See No. 16 in the accompanying list of fires.) By carefully selecting the components, however, it is possible to make up mixtures that have fairly stable flash-points at all stages of evaporation.

VOLATILITY—Volatility is the tendency of a liquid to pass into vapor and is measured by comparing the liquid's rate of evaporation with that of the same volume of ethyl ether under the same conditions. If a liquid evaporates three times more slowly than ether, it is said to have a relative volatility of 3.

With respect to volatility, liquids may be classified as follows:[7]

CLASS OF LIQUID	RELATIVE VOLATILITY
Highly volatile	Below 7
Moderately volatile	7 to 35
Slowly volatile	Above 35

As almost all fires originating in volatile liquids start with the ignition of the vapor, the more volatile the liquid, if flammable, the greater the fire hazard it presents. As will be seen from the table, all of the extra-hazardous solvents are characterized by high volatility as well as low flash-point.

IGNITION TEMPERATURE—The ignition temperature of a solvent is the lowest temperature at which a flammable mixture of its vapor and air will ignite. It is not to be confused with the flash-point, which is the minimum temperature at which a liquid gives off vapor that, when mixed with air, can be ignited by a body heated to the ignition temperature.

Carbon disulfide has so low an ignition temperature (212° F) that its vapor may be ignited by steam radiators, electric lamps, ovens, and other moderately hot objects commonly found in industrial plants. Ether, too, has a low ignition temperature, and gasoline vapor will be ignited at temperatures that are well below red heat.

Kerosene, turpentine, and Stoddard's solvent have ignition temperatures that are lower than that of gasoline, but they are much less hazardous because of their higher flash-points and relative volatilities.

Other flammable solvents, as a rule, have ignition temperatures above 700° F, but all will be ignited by flames, sparks produced mechanically or electrically, and glowing metals. (Fires 5, 7, and 13 illustrate some of the more unusual ways in which sparks may be produced.)

One cause of ignition that has been responsible for many flammable-liquid fires and explosions is static electricity. When the relative humidity is below 55%, static sparks may be formed when an organic solvent that is a poor conductor of electricity is poured from one metal container into another, or when it is rubbed against a surface, as in cleaning clothing or machinery. Because of this hazard, handling solvents like gasoline, even in small quantities and out of doors, is

THE FLAMMABILITY OF COMMON ORGANIC SOLVENTS

SOLVENT	U. L. Flammability Rating	Flash Point ° F.	Relative Volatility Ether = 1	Ignition Temp. ° F.	Vapor Density Air = 1	Lower Expl. Limit % Vol.
EXTRA-HAZARDOUS LIQUIDS						
Carbon disulfide	110	−22	1.8	212	2.64	1.0
Ethyl ether	100	−49	1.0	356	2.56	1.85
Petroleum ether	95-100	−69	3.5	475	2.50	1.4
Ethylene oxide		below 20		804	1.52	3.0
Benzine	95-100	0	3.5		4.48	1.1
Gasoline	95-100	−45	3.5	495	3 to 4	1.3
Benzol	95-100	−4	3.1	1,000	2.77	1.55
Acetone	90	0	2.1	1,000	2.00	2.55
Ethyl acetate		24	2.2	800	3.04	2.2
Cyclohexane		1	3.1		2.90	1.3
Methyl acetate		14	2.2	850	2.56	4.1
Isopropyl ether		15				
Butyraldehyde		20			2.48	
Solvent naphtha	(a mixture of benzol, toluol, and homologues)					
HAZARDOUS LIQUIDS						
Toluol	75-80	40	6.1	1,026	3.14	1.27
Methyl alcohol	70	52	6.3	800	1.11	6.0
Crotonaldehyde		55			2.41	2.9
Ethyl alcohol	70	55	8.3	700	1.59	3.5
Ethylene dichloride		58	4.1	775	3.42	6.2
Denatured alcohol	70	60		750	1.60	
Iso-Propyl alcohol	55-60	59	21.0	700	2.07	2.0
Propylene dichloride		63		1,035	3.89	3.4
Zylene-o		63	13.5	900	3.66	1.0
Ethyl benzene		59			3.66	
Butyl acetate	55-60	72	12.0	790	4.00	1.7
Methyl isobutyl ketone		73	approx. 12.0		3.45	1.2
2-Nitropropane		75				
Amyl acetate	55-60	77	15.0	750	4.49	1.1
Dibutyl ether		77			4.48	
Iso-butyl alcohol		82	24.0	800	2.25	1.7
Nitroethane		82				
Mesityl oxide		90				
1-Nitropropane		93				
Turpentine	40-50	95		464		0.8
Nitromethane		95				
Diethyl cellosolve		95				
LIQUIDS OF MODERATE TO LOW FLAMMABILITY						
n-Butyl alcohol	40	100	33.0	700	2.55	1.7
1-Chloro-1-Nitropropane		102				
Kerosene	40	100-165		490		
Stoddard's solvent	30-40	100-110		450		1.1
Amyl alcohol	35-40	114	62.0	650	3.04	1.2
1-Nitrobutane		115				
Ethylene dichloride		58	4.1	775	3.42	6.2
Monochlorbenzene		81	12.5			
Isopropyl benzene		97				
o-Dichlorobenzene		151	57.0		5.10	
Cyclohexanol		154	400.0		3.45	
Diethyl benzene		138				
Trichlorbenzene		212				
1, 1-Dichlorethylene		57		850	3.35	5.6
NON-FLAMMABLE LIQUIDS						
Methylene chloride	(none at ordinary Temperature)		1.8		5.37	
Trichlorethylene	1-2	Vapor, at high temp., under certain conditions, forms explosive mixtures	3.8		4.53	
Carbon tetrachloride	0	Non-combustible	3.0		5.32	
Tetrachlorethylene	0				5.72	
Tetrachlorethane	0					
Ethylene Dibromide	0		33.0		5.79	

Note: For many of the newer solvents, no flammability ratings have as yet been assigned by the Underwriters' Laboratories.

dangerous when the air is dry, unless the proper precautions have been taken.[5,6] Flammable vapors may also be ignited by the spontaneous heating of certain materials.

VAPOR DENSITY—The vapor density of a solvent is the weight of its vapor as compared with that of an equal volume of air under the same conditions of temperature and pressure.

The vapors of all industrial solvents are heavier than air, so that, unless heated, they sink in still air, and, in conformity with a physical law, which states that the velocity of diffusion of a vapor in air is inversely proportional to the square root of its density, they mix rather slowly with air.

Their behavior, therefore, is different from that of gases that are lighter than air, such as illuminating gas. The latter rise, and, if they cannot escape through upper ventilating openings, become quickly diluted with air. Relatively small quantities released in an unventilated room are found at the working level only in very low and uniform concentrations.

On the other hand, the vapor given off by a solvent tends to form a low-lying, concentrated stream, which may travel 30 feet or more from its source, and, if flammable, may become ignited and flash back. As the vapor stream is invisible, its presence may be unknown until ignition occurs. Even testing the air at various points in the surrounding area may fail to reveal it. Flowing vapors caused Fires 10 and 16 and, doubtless, others in the list.

LOWER EXPLOSIVE LIMIT—The lower explosive limit of a solvent is the minimum concentration of its vapor in air that will ignite. Concentrations below this limit (or, as the motorist says, mixtures that are too lean) are non-flammable. Therefore, when flammable vapors are mixed with a sufficient volume of air, there is no danger of explosion.

As the lower explosive limits of all industrial solvents lie well above the maximum allowable concentrations for the continuous exposure of workers, it is sometimes said that the explosion hazard is eliminated when good working conditions are maintained. But, as has been seen, keeping the air breathed by the workers at the requisite level of purity gives no assurance of fire safety. Owing to the stream-forming tendency of solvent vapors, they may collect in local concentrations that may not menace health but may be dangerous as fire hazards.

Furthermore, keeping the atmosphere of a room satisfactorily pure does not remove the vapors from any partly or wholly emptied flammable-liquid containers that may be present. Accidents of this kind are illustrated by Fires 3 and 14.

Nor is there danger to health in small quantities of flammable liquids spilled on hands or garments; but, such conditions may have fatal consequences.

Safety Measures

WHEN flammable solvents are being used, the following precautions should be taken in areas where their vapors are likely to be present:

1. Eliminate all fires, flames, and sources of sparks or high temperatures, and prohibit smoking. In extreme cases, tobacco and matches should be removed from workers before they enter the area, shoes with no metal in the soles should be worn, and non-sparking bronze tools should be provided.

2. Install all electrical equipment in accordance with the requirements of the National Electrical Code for hazardous locations. Ordinary portable electric lamps should never be used.

3. Electrically ground all equipment for handling flammable solvents, including funnels and portable containers when the latter are being filled or emptied.

4. Provide ample ventilation (natural, if possible) to keep the concentration of flammable vapors far below the lower explosive limit, especially in low points, such as shafts, pits, basements, etc.

5. Provide adequate fire-extinguishing equipment of the proper types, and train all workers in its use.

6. See that all workers fully understand the hazards of their work and know what must be done to prevent fire.

Fires Involving Industrial Solvents

FROM the records of the National Fire Protection Association:

1. When welding work was being done in the ducts of an acetone recovery unit, an explosion occurred, which wrecked a textile plant, injured 73 and cost $500,000.

2. A machine, filling tubes of rubber cement in a rubber plant, exploded from unknown cause, killing two and causing a $250,000 loss.

3. A spark from a welding torch being used in a machine shop fell into an uncovered opening of a benzol drum. The drum exploded and started a fire by scattering its blazing contents. Loss, $75,000.

4. Flammable solvents in a large space where airplane parts were being finished caught fire, destroying the factory and adjoining buildings. Loss, $1,030,000.

5. A broken electric lamp bulb ignited the vapor in a spray booth of a metal-working plant, costing $495,000.

6. Paint spilled by accident was ignited by the flame of a gas water heater in a metal-working plant. One person was killed, and the loss was $241,000.

7. When a workman in a chemical plant tried to open a can of acetone with a hammer and a screw driver, the sparks ignited the vapor and the can burst into flame. The fire was spread by several drums of alcohol. Loss, $18,500.

8. A short circuit in a motor sent sparks into a barrel of lacquer, causing a $30,000 loss in an iron works.

9. A small quantity of gasoline, spilled on the floor of a plant making steel tanks, caused a flash fire, which resulted in a loss of $143,750.

10. Naphtha fumes, creeping from the hardening room of a plant making cartridge tools, were ignited by sparks from a furnace. Loss, $140,000.

11. An explosion, said to be due to the use of gasoline for cleaning guns, caused the death of 11 persons.

12. Gasoline being used to clean machinery was ignited by sparks from an accidentally opened switch, causing $15,000 loss in an airplane repair hangar.

13. An iron grid, falling into a paint-disposal pit in an airplane factory, emitted sparks which ignited the volatile vapor. Loss, $8,000.

14. A man, welding an "empty" gasoline tank, was killed when the tank exploded.

15. Vapor from gasoline-soaked sawdust, used for cleaning furs, exploded, killing six, injuring about 60, and causing a loss of $500,000.

16. Gasoline vapor, creeping from a machine used in rubber curing, was ignited by sparks caused by friction and flashed back, setting fire to the machine. The gasoline used was diluted with carbon tetrachloride to render it non-inflammable, but, at the time of the fire, the amount present in the gasoline was insufficient for this purpose. Loss, $1,906,000.

17. Exploding flammable-liquid vapors killed 10 in a factory making polishes. Flames spread to adjoining buildings, causing a loss of $2,000,000.

18. Fire, attributed to the spontaneous ignition of paint-soaked clothing, ignited flammable vapors in the finishing room of a farm-machinery plant. Loss, $541,850.

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Industrial Health Units

—Considerations and Designs for the Smaller Installations—

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ALMOST all the progressive industrial organizations in this country, particularly in their larger units, have health departments that employ nurses and one or more full-time physicians. Because these health services usually have been in operation for a number of years and because they frequently have had the advantage of consultation with industrial architects, some highly practical arrangements of space and equipment that considerably expedite the volume and effectiveness of their work have been developed.

An understanding of why and how these arrangements can best be made has been quite slow in filtering down to the small plants. It is in these smaller plants, representing over 95% of the industrial units of this country, that help seems most distressingly needed. Frequently, the floor plans and equipment of their health departments make it even more difficult to increase their productive effectiveness, although this *must* be done, with the added complication of shortages of personnel and supplies.

The observations that follow represent an effort to correlate the uses and needs of health services in small plants with considerations of space and the arrangement of equipment. It is hoped that these statements will be sufficiently reasonable and concrete to be of assistance during both the installation or remodeling and expansion of such units.

It would seem well to open our problem with the type of unit adaptable to the smallest plant and the most primitive health concepts. How does one arrive at a just statement of this minimum?

The basic health unit for any plant can best be assembled from three mandatory statements found in the sanitary regulations or laws of almost every state. These requirements concern the company's responsibility for furnishing (1) a toilet, (2) a rest room, and (3) first aid supplies.

Experience has shown that the toilet used by the front office force is the one most apt to be well maintained. Since in the small plant the manager either gives the first aid treatment himself or makes whatever arrangements and reports are indicated, it would seem the most expeditious use of space and equipment to have a rest room adjacent to this toilet and adapt it to the administration of first aid and other health problems.

In a small plant, the proximity of the front office and manufacturing division usually relieves one of the necessity of considering placing such a unit any more conveniently for all employees.

Fig. 1 (modified from New York State Special Bulletin No. 213) shows the floor plan of such a unit with an arrangement of the necessary equipment. The wisdom of having a door leading from the first aid room to the outside should be immediately apparent to anyone who has been present at the time of any reasonably serious accidents in a factory. This outside door obviates the necessity of carrying an injured employee either back through the factory or through the front office, with the confusion and additional loss of production that accompanies such moves. Also, an outside entrance could be used by employees who were returning to the plant for redressings, or for other services, courtesies or information supplied by the company.

It would probably be well at this time to call attention to the advantages of having cabinets attached to the walls wherever possible. This method economizes on floor space and makes cleaning easier. Also, it may reasonably be expected that walls which are of sufficient strength to support cabinets will not only keep out noise, vibration and fumes from the plant, but also act as an added guarantee of the confidential nature of communications between employees and the nurse or other representative of management in the health department.

A fairly adequate storage space for supplies used in a unit this small may be obtained by putting in a shelf six feet, six inches from the floor over the toilet—another over the lavatory, if necessary. A small space is provided where a record can be made out on the table-top hinged to the wall. Since this health unit was designed to accommodate only emergencies, the records covering these services would be kept elsewhere in some safe place by a responsible full-time employee.

It may seem an insult to intelligence to stress the need for good lighting here—not only for the rooms, generally, but also a portable light that can be brought to bear on a given field. However, such a consideration is sometimes neglected until someone is searching for a foreign body in the eye, or a glass splinter in a finger. Also the tendency of people who are ill or injured to feel that any room is stuffy is well known. Ventilating fans can frequently save fainting, or the increase of nausea to the point of vomiting. The need for hot, as well as cold, running water is of course apparent.

Fig. 1a is even simpler than Fig. 1, but should be used only when the advantages to be gained in the original plan are not feasible. It is designed for plants that do not occupy the first floor of their building or where the location of this unit in the plant would make an outside door impossible. The plumbing fixtures are also shifted about to remind one to investigate the local plumbing code which may require toilets and other fixtures vented within six feet of the outer wall.

As the plant grows, careful management will realize the necessity of having someone (maybe on a part-time basis in the beginning) not only to administer first aid, but also, under the written orders of a licensed physician, to extend the courtesy of minor redressings, medications and immunizations. Usually such an employee is also expected to assist management and its personnel department in the promotion of safety and welfare services and the investigation and supervision of absentees. Space must be provided, therefore, for someone who will have a definite list of duties. Registered nurses are, of course, the ones best qualified to administer such duties in the plant.

Since such a service is a direct growth from those basic necessities required by law which we have considered, it would seem reasonable to have the necessary space for the nurse added to that already considered.

Figs. 2 and 2a show floor plans applicable to the phase of the development of an industrial health program that envisions a nurse on part-time or full-time duty. Neither of these plans, however, contemplates the services of a physician in the plant except on an "on call" status. This is the customary arrangement in small plants. Rooms are provided in anticipation of the need of beds for both men and women who may be *temporarily* ill.

Before additional rest room space is provided, it would be wise to consider the use of double-deck bunks. Frequently these have been found to be entirely feasible for industrial needs. These beds or cots are used mostly by employees who are acutely nervous or by women with menstrual problems—much more seldom by other employees who are faint or nauseated with

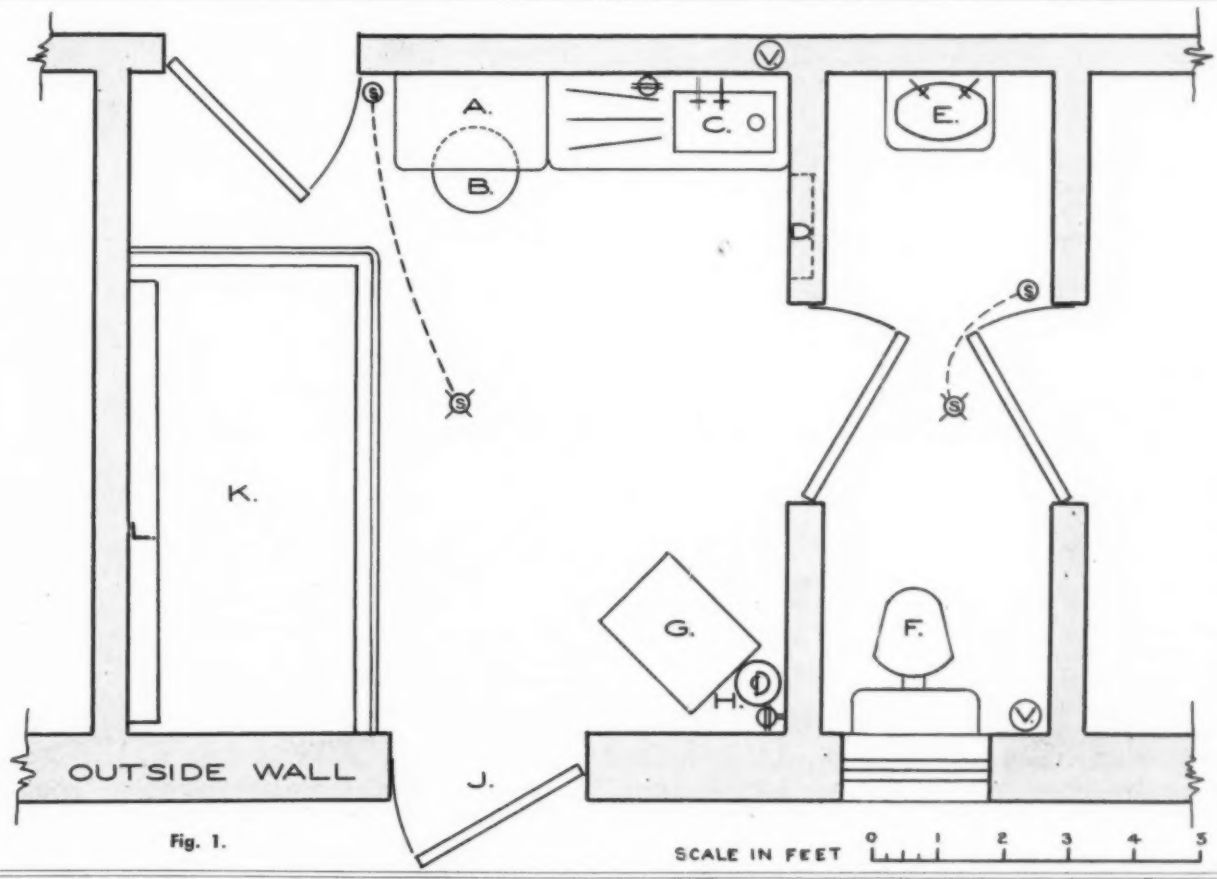

Fig. 1.

sickness or by injury. It might be well at this point to stress the need for electrical outlets beside each bed for the convenience of plugging in electric heating pads, lamps, or such physical therapy equipment as seems indicated.

No alley is provided for checking visual acuity on a Snellen test card. Such an arrangement takes 20 feet. A telebinocular, though more costly as an original investment, can be placed on a small table. With such an instrument it is possible for a nurse to make a rapid, simple and effective check, not only on visual acuity but also color vision, depth perception and

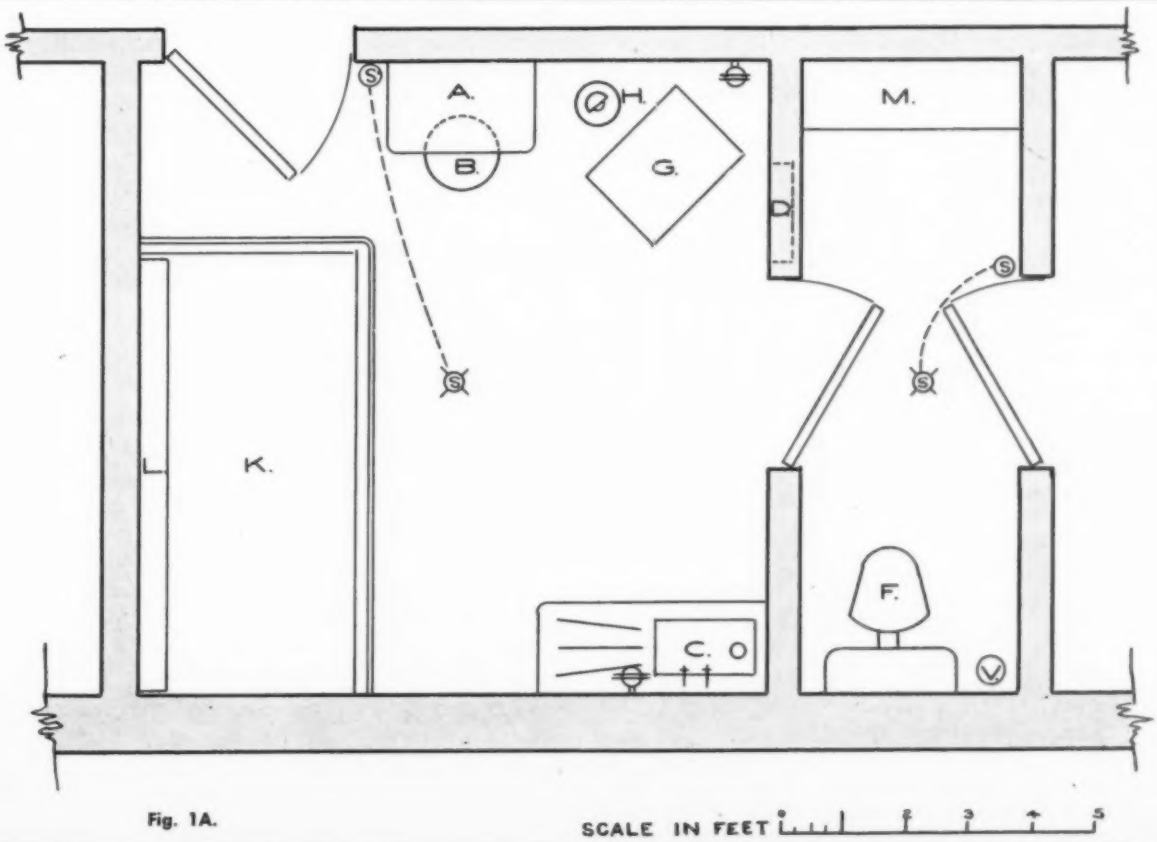

Fig. 1A.

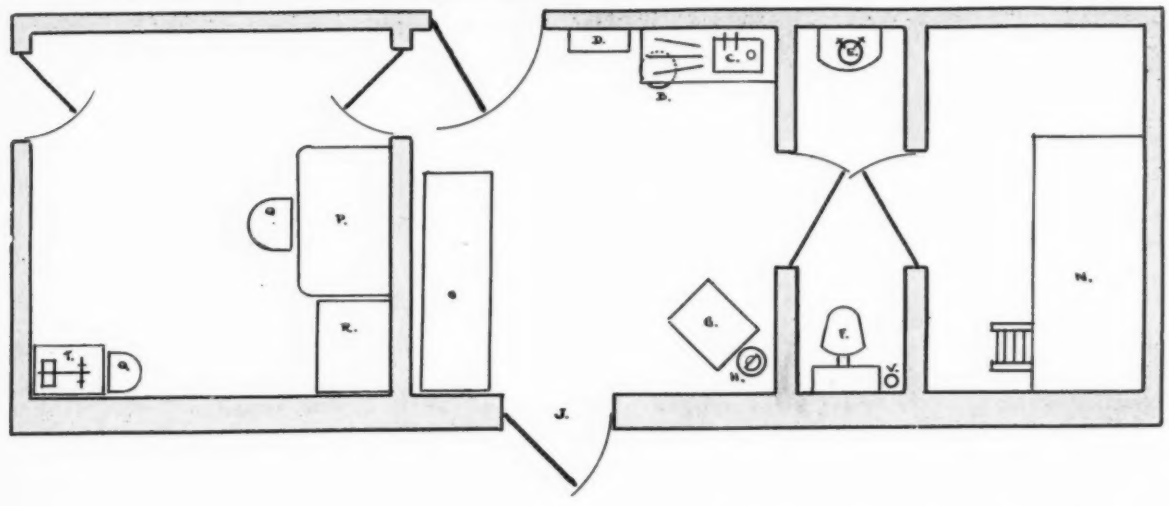

Fig. 2.

other qualities of ocular function or abnormality of industrial importance.

By having the nurse's office at the entrance to the rest room, ill or injured employees would be assured of receiving prompt attention in the interest of most rapidly making them comfortable for their return to work or their transportation home or to the hospital. The tendency to make a congregating place out of the rest room for wasting time during working hours would also be reduced.

The door of one of the dressing rooms is made large intentionally, to allow for rolling in and out a wheel stretcher. Indeed, in the plant where heat prostration or severe accidents are a possibility, it might be wise to have a wheel cart type of stretcher instead of a bed in this room. This wheel cart could be used both out in the plant and in the health department, and might even be taken to the hospital in the ambulance—a method that saves the repeated and painful, or even dangerous, moving of patients in emergencies.

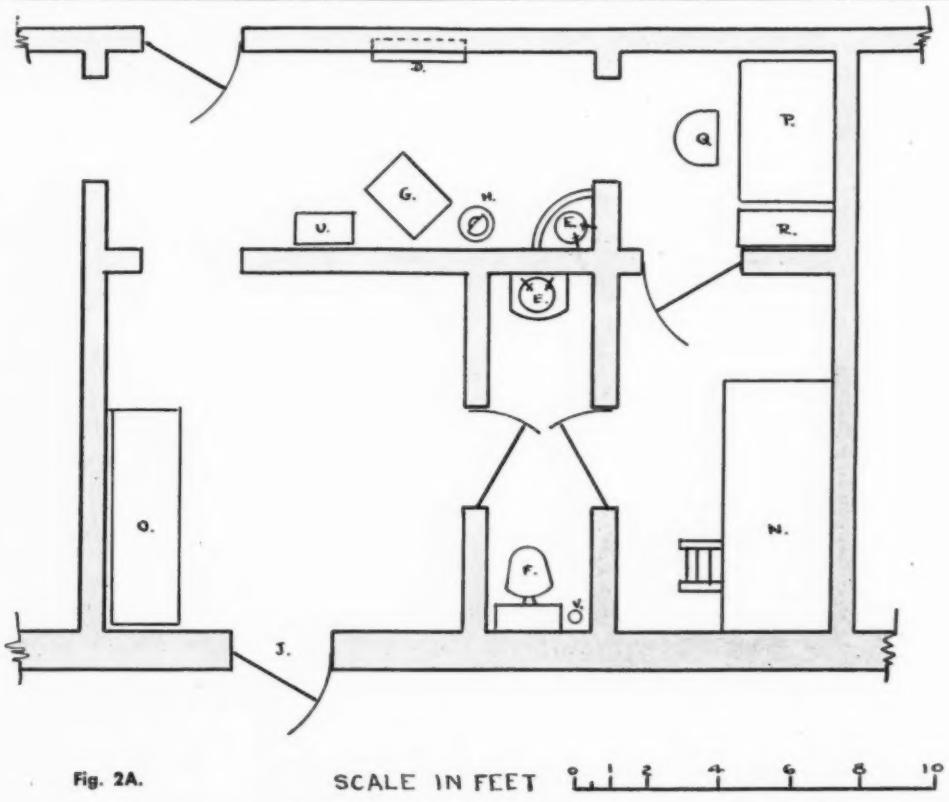

Fig. 2A.

A. Table top hinged to wall.
B. Swivel stool.
C. Sink, with sterilizer on shelf over.
D. Medicine cabinet.
E. Lavatory, hot and cold running water.
F. Toilet, with storage shelf over.
G. Examining chair, with arm and head rests.
H. Goose-neck floor lamp.
J. Outside door.
K. Cot, or double-deck bed.
L. Stretcher, on wall brackets 6 ft. from floor.
M. Storage cabinets.
N. Double-deck bed.
O. Wheel stretcher.
P. Desk.
Q. Chair.
R. Filing cabinet.
S. Light or switch.
T. Telebinocular on small table.
U. Mayo table.
V. Ventilator.
X. Lockers.
Y. Pegs for hanging clothes.
Z. Examining table, with arm rest.

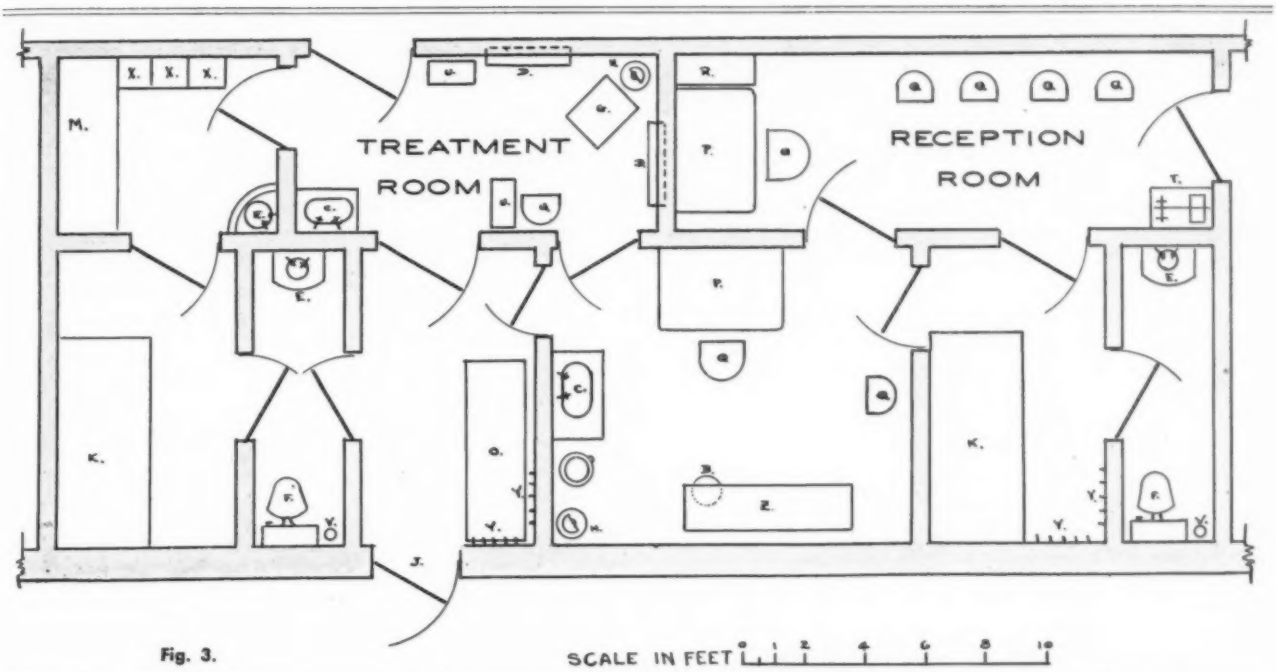

Fig. 3.

Fig. 3 is the normal development of the previous plans. It is designed for the progressive small plant that has full-time nursing service and a physician in regular, if part-time, attendance. This plan envisions handling the minor accident cases as well as the pre-placement examinations and other functions of a full preventive program in the plant. The door from the reception room leads into the personnel office for the convenience of applicants undergoing pre-placement examinations and employees who are returning to work after an illness. All employees from the plant would use the other door entering directly into the treatment room. A small well-run plant would have so few accidents that by careful scheduling of the other appointments there should seldom be any need for a waiting room here. In case of emergencies, problems could be cared for in both the treatment room and the rooms adjacent to it with a minimum of apprehension of prospective employees or the disruption of other necessary jobs.

This separates the plant health department into its two divergent functions—examination and prevention, and treatment.

AT THIS point, it seems wise to think again of the practical fact that employees coming to the health department for redressings of their injuries are already on the company's payroll and, as such, the time spent by them in the health department is an undisguisable direct cost to the company. Unless care is given to making an exact appointment of cases for redressings, they will usually all come in at the same time before their mid-shift meal or just before going home, thus congregating because it frequently affords them an opportunity to smoke in the plant, or by all coming together it is easier to hide the exact amount of time required for handling the individual job.

The physician's office is in the center connecting the various functions of the health department. As a precaution to save awkwardness or embarrassment during examinations or consultations, the doors, with the exception of the one from the treatment room, should have knobs fixed to open only from inside his office.

There are rooms on either side of the physician's office where men and women may be divided into separate groups and prepared for their examinations. The men, of course, are completely stripped while the women are stripped to the waist and their shoes and stockings removed. With the women, towels are put across their chest, front and back with a pin over either shoulder. This "towel shawl" for women saves time and embarrassment during examination of the heart and such physical examination of the chest as is deemed reasonable and effective. In most companies, it is considered better practice to have the specimens of blood and urine collected by the nurse at the time she takes the history and does the preliminary inspection.

The waiting room, treatment room and nurse's dressing room are all only six feet wide. It would, of course, be an advantage if these rooms were wider. The floor plan shows this width because 16 feet from pillar to pillar is usually considered the most efficient method of concrete construction. If in a given plant there are longer spans or the construction allows more room, it would probably be helpful to add two to four feet to the width of these rooms.

Except during the time the physician is completing physical examinations, the dressing rooms on either side of his office are available as rest rooms. Having rest rooms in the plant not connected with the health department only encourages wasting time and the collection of debris. If there are areas in the plant from which the central health unit is not readily accessible, it would seem preferable to consider adding another of the small units at such a place and having a nurse in attendance there at stated hours each day.

When vaccine and other immunization are extended to employees, refrigeration must be available for storing these supplies. In Fig. 3 a small refrigerating unit could be installed in the storage area. In some plants a locked box of these supplies is kept in the refrigerator of the canteen or other in-plant food service.

X-ray facilities are not included in this floor plan, since such a service is not usually considered a financially sound installation for the small plant under present circumstances.

This analysis has intentionally eliminated any statement about the volume and variety of forceps, syringes, drugs, towels and other small supplies that must be provided. Except to remind one that all these items are subject to breakage or loss and should, therefore, be

purchased in duplicate, it is felt that the literature is sufficiently filled with suggested lists of such things. The purchase order for an individual plant must of necessity be conditioned by the volume of work to be done, the company's policy relating to the scope of health supervision, and the special interests of the supervising physician. The authors feel themselves incapable of adding anything to the solution of an equation containing three variables.

Pruritus Ani and Absenteeism

—A Review of the Literature, and a Report on a New Form of Adjuvant Therapy—

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AMONG the many ailments that cause employees to remain absent from their jobs is pruritus ani. Coupled with the increased tension and nervousness among workers in modern war industries, is the torment of pruritus ani. No worker, skilled or unskilled, can possibly carry on his work satisfactorily, if his attention is constantly being drawn to his pruritus. It is well known that pain is a factor which often saps vitality. Pruritus ani likewise lowers vitality and, of course, efficiency. It is often difficult to correct, thus palliative measures must be taken to give the afflicted worker peace of mind and physical comfort.

In the past fews years an impressive bibliography has been built up on the subject of pruritus ani. A review of the literature reveals the multiplicity of causes of this disease, and the numerous treatments suggested to control it. The mere fact that there is so much controversy concerning the causes of this distressing condition is evidence enough to indicate the problems facing the physician treating pruritus ani. The disease is so common that it is not unreasonable to state that nearly every one has at some time or other experienced the symptoms in one degree or another. In many cases the itching persists over a period of time, and in a large percentage becomes a very definite and annoying symptom. Hayden[1] states that perianal itching is the fourth most common complaint referred to this locality. The patient who suffers repeated or constant attacks becomes a pathetic figure. He is unable to obtain rest or sleep, he can no longer carry on his social contacts, and in the end turns all his attention to the symptoms that plague him with no reprieve.

Within the last few years the author has been using a relatively new form of therapy as an adjuvant to other local treatment, and has found it to be satisfactory in a large enough percentage of patients to warrant it being reported in the medical literature.

Incidence

THE exact percentage of the population of this country suffering from pruritus ani is not known as many of them, lured on by the numerous patent medicines, resort to self medication. A survey of the literature readily indicates that from 10 to 25% of the adult population are victims of pruritus ani in one form or another.

Etiology

THE etiology of pruritus ani is quite controversial. A great many single causes have been described, but apparently a combination of disorders would be more accurate, depending, of course, on the individual involved. If all of the causes that have been described by competent authorities are listed, it readily becomes apparent that they must be divided into three groups. The following outline, taken from Bacon,[2] shows how the causative factors may be grouped in a concise manner:

I. Predisposing causes:
   (a) Mental (worry, overwork, etc.).
   (b) Habits (alcoholism, sedentary life).
   (c) Constitutional (diabetes, gout, liver disease, etc.).*

II. Indirect causes:
   (a) Mechanical causes (fissures, fistula, hemorrhoids, etc.).
   (b) Infection (cryptitis, lice, worms, scabies, fungi).
   (c) Food sensitivity (tomatoes, berries, shellfish, etc.).
   (d) Drugs (quinine, morphine, belladonna, etc.).

III. Direct causes:
   (a) Traumatic (abrasions, chafing, prolapsing hemorrhoids).
   (b) Chemical (discharges from anal or vaginal regions).
   (c) Skin diseases (eczema, scabies, fungus disease).
   (d) Physical uncleanliness, excessive sweating.

Among predisposing causes, extreme fatigue and worry are factors that can be found in a majority of the case histories. It has been established by Cushing and others that, in a large percentage of patients suffering from gastric or duodenal ulcers, there is a definite psychogenic factor preceding the symptoms. A fatigued and harassed patient tends to become neurotic, magnifying minor symptoms into extreme realities. This constitutional factor is quite obvious and must be met and eliminated before relief can be expected.

Among the indirect causes, the mechanical are extremely important as they act over a long period of time and produce chronicity. While there is no distinct correlation between hemorrhoids and pruritus ani, the two are seen in association so frequently, that it is impossible to rule out the cause and effect mechanism. Hemorrhoids that protrude and allow weeping of the mucosa, and hemorrhoids that produce spasm of the sphincter ani might well be considered a direct cause. Another indirect cause that has apparently been increasing of recent years is the ingestion of bulk and fibrous foods. Sharp grain flakes and husks can and do cause trauma of the anal mucosa. Certain vegetable fibers and woody pulp can do the same thing. Given multiple small excoriations of the anal mucosa it is not too difficult to visualize the secondary result as a pruritus ani. The constipation following starvation diets plus the aversion most elderly females have toward drinking water, brings about a definite trauma to the anus by the passing of concrete-like stools.

Among the direct causes, skin diseases, especially fungus infections and intertrigo, must be considered of importance. Baird[3] points out that the perianal region with its furrows and ridges is a definite intertrigous surface, and an area in which fungi infection is the primary cause. Terrell[4] estimates that 90% of the cases of pruritus ani are of primary fungus origin. It is frequently impossible to isolate a fungus from the perianal region, especially if secondary infection has developed. This may be due to the difficulty in isolating the fungi or because the secondary infection sets up an environmental condition that eventually kills off the primary invaders. Perianal uncleanliness is an apparent primary cause in a certain proportion

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*Drueck[25] stresses avitaminosis among the systemic factors.

The cod liver oil ointment (Gadoment) and capsules (Gadolets) used in this study were supplied by The E. L. Patch Company, Boston, Massachusetts.

of the cases. This factor is frequently forgotten by the practitioner as most of the patients that he sees in his office come in clean. Unless he questions them carefully he is apt to assume that they have always been clean. Patients with no symptoms of itching around the anus are prone to ignore that area; perspiration, sebaceous secretions and particles of feces can play an important role in setting up the conditions that lead to pruritus ani. The advanced case is usually scrupulously clean as most of the day and night is spent applying lotions, powders, salves, and soap and water.

Pathology

IN SOME patients suffering from pruritus ani, there is no demonstrable pathology. The fact that the patient has itching can be obtained only from the history. In most cases, however, there are characteristic and persistent anatomical changes. At times there is merely pallor and dryness. These signs usually occur early, especially in elderly people. Frequently there is a distinct hypertrophy of the perianal skin. Rugae are built up radially from the anus. There are deep furrows between, in the depths of which the skin is moist, excoriated and red. Often an excoriation is seen running posteriorly in the intergluteal fold towards the coccyx. Secondary excoriations are frequently found, caused by scratching. At times these latter excoriations are deep enough to produce bleeding. As the pathology progresses, the skin becomes moist, whitened and soggy, tending to peel. The hypertrophy increases, presenting an appearance such as is seen between the toes when there is a fungus infection present. At times a reddened secondary infection presents itself, especially after scratching. This is usually a localized cellulitis. There may or may not be edema. It is apparent that the anus and perianal region have a high local immunity to infection, because a widespread cellulitis is seldom seen. In the more advanced cases, the skin around the anus becomes dry and leathery. It loses its elasticity and becomes markedly hornified. Microscopically, the pathology exhibited by pruritic skin can be divided into three stages, dependng on the severity and duration of the disease. Drueck[25] speaks of the perineal dermatoses of children.

In the first stage there is an inflammatory reaction characterized by round cell infiltration, dilatation of the lymph and blood vessels, and edema of the Malpighian layer. In the second stage there is a thickening of the epidermis with a distinct destruction of the cells of the Malpighian layer. In this stage the epithelium becomes hypertrophied and begins to exhibit marked rugae and sulci. In the third stage there are excoriations with fissures and ulcers. Secondary infection exists associated with a pyogenic membrane and edema. The ulcers are indolent and there are many epithelial defects due to scratching.

Treatment

MOST forms of therapy for pruritus ani fall into two groups. Group one consists of solutions, lotions, powders and ointments, all recommended to promote healing, and to destroy any fungi and bacteria present. Most forms of local medication seem to contain salicylic acid and an antiseptic. The action of this medication is to promote a peeling of the epidermis, thus permitting the antiseptic to enter into direct contact with the organisms found under the upper layer of the skin. The ointments cover exposed nerve endings producing a sensation of relief and comfort. Group two is composed of the anesthetic solutions to be injected under the skin in the perianal region. These relieve itching and allow the patient to rest, thus avoiding scratching and possible secondary infection. Stone[5,6] injects 95% alcohol. He puts two to four drops at one quarter inch intervals around the entire area. Buie[7] prefers 40% alcohol injected in doses up to 40 cc. Hanes[8] advocates the injection of a solution made of one part of hydrochloric acid to 3000 parts of water. Quinine and urea hydrochloride 0.5% to 1% has been used by Hirschman.[9] Gabriel[10,11] has brought out two solutions, and Morgan[12] one.

Surgery has been used by some in an effort to sever the sensory nerves entering the perianal region. An undercutting operation was described by Ball[13,14] in 1907. This form of therapy has apparently been discarded, owing to the possible complications of scar tissue followed by diminished vitality and atrophy of the skin.

X-ray and ultra-violet rays have been used extensively with apparent success in a percentage of the cases. As a rule when x-ray is used one or two suberythema doses are given or four to eight fractional doses. Relief from itching comes on about two weeks after the beginning of the treatment.

Ionic therapy has been reported as valuable by Rolfe.[15] By means of a low-volt electrical current, certain metallic salts such as zinc, mercury, iodine and copper are driven into the deeper layers of the skin, liberating ions. Other investigators have been unable to obtain the same results, finding the method very unreliable.

Tattooing and electro-desiccation have also been tried. These methods still require a more extensive controlled clinical trial.

Cod Liver Oil and Cod Liver Oil Ointments

COD LIVER oil and cod liver oil ointments have been used by the author for the past eight years in various types of skin disorders, indolent ulcers and burns, and in superficial infections, such as eczema and pruritus ani. Lohr[16] was the first to publicize this form of therapy. Aldrich[17] advocated cod liver oil to stimulate indolent burns. Wakeley,[18,19] in a discussion of war burns, spoke very favorably of cod liver oil for burns of the face. Hardin[20] reviewed the literature and reported 346 cases of various types of wounds. He was of the opinion that cod liver oil ointments are very effective therapeutic agents. Others have reported very satisfactory results when cod liver oil ointments were used on such conditions as burns of the cornea, eyes and lids, pruritus ani and vulvi and ulcers of the feet in patients with diabetes.

The mechanism of the local action of cod liver oil is still unknown. At first it was assumed empirically, that its activating quality was contained in the vitamin content of the oil. Lohr and Unger[21] concluded that it was cod liver oil fractions such as the unsaturated fatty acids that promoted healing. Clinical experience indicates that the whole oil appears more efficacious than any fraction so far isolated. It is highly probable that the various fractions and vitamins assume a synergistic role.

Lohr and Treusch[22] found cod liver oil to have bactericidal and bacteriostatic qualities. Oil inoculated with streptococci and staphylococci and colon bacilli was sterile after 24 hours. Tumanskiy and Yatsevich[23] found that the growth of the streptococcus and staphylococcus ceased within six hours after being inoculated into cod liver oil.

Most workers are agreed that when wounds are treated with cod liver oil: (1) there is a decrease in local infection, (2) necrotic material is liquefied, and (3) granulation tissue and epithelization are stimulated. The rapid liquefaction of necrotic material is reported, due to a marked leukocytic response. The Council on Chemistry and Pharmacy of the American Medical Association[24] concludes that there has been a significant number of clinical reports favorable to the

use of cod liver oil ointments in the local treatment of burns, of all types of wounds and of ulcers. They feel, however, that more investigative work should be done in order to determine the exact role played by the cod liver oil in wound healing.

Cod Liver Ointment as an Adjuvant Treatment

FOR THE last eight years the author has been using a cod liver oil ointment alone in the treatment of pruritus ani, and in conjunction with the injection of 95% alcohol following the technique of Stone. In most cases the ointment was used for a period of a week, and then the alcohol resorted to, if necessary. While the results obtained with the ointment were gratifying, it was difficult for the patients themselves to apply it. They rarely were able to get the substance as high as the mucocutaneous border, and almost invariably spread it on the surrounding area of the skin of the buttocks, soiling their clothes. A great many patients objected to applying the ointment themselves, from the esthetic point of view. Drueck[25] stresses the palliative treatment with ointments in the pruritus ani of the aged.

About two years ago a 70% cod liver oil ointment was put up in the form of a gelatin capsule. Each capsule contains approximately 2.5 grams of a rather semi-solid cod liver oil ointment. The capsule tapers at one end allowing for easy insertion into the anus, after an incision has been made on the side of the tip to permit expulsion of the ointment. With light pressure on the body of the capsule, the cod liver oil ointment can be squeezed up into the anus, and then applied directly to the perianal region. This capsule marked a distinct advance, and was well-liked by patients.

Each patient was instructed to keep the itching region scrupulously clean with cool tap water. This is especially important following each bowel movement. It was specifically pointed out that no soap should be used, since this might introduce a further irritant. Soft wet cotton or tissue paper was recommended as the cleansing material of choice. The capsulated cod liver oil ointment was recommended for use as often as necessary. Each patient varied in his own requirements, most using about 2-3 gelatin applicator doses daily. It was suggested that the ointment be applied directly after cleansing.

The author has used the above described cod liver oil ointment capsules on 29 patients. The cases were consecutive except when an emergency operation for thrombosed hemorrhoids was necessary. The table following contains all of the pertinent facts relative to the use and results of this form of cod liver oil oint-

Sex	Age	Occupation	Involved	Duration of Disease	Previous Local Rx	Organic Disease Elsewhere	Psyche	Allergies	Previous Operation
M	33	salesgirl	R	2 months	no	cystocele	nervous	none	hemorrhoidectomy
F	52	housewife	R	6 months	no	internal hemorrhoids	normal	none	none
F	42	nurse	R	3 months	no	internal hemorrhoids, 12 years	normal	none	none
M	69	none	R	6 months	no	hemorrhoids, 30 yrs.	nervous	none	none
M	44	salesman	R	2 years	yes	intergluteal intertrigo	nervous	none	hemorrhoidectomy
M	27	soldier	R	4 months	yes	chronic alcoholic	nervous	none	hemorrhoidectomy
F	39	housewife	R	2 months	no	cystocele-rectocele	normal	none	none
M	52	salesman	R	3 years	yes	no	normal	none	none
F	31	housewife	RV	3 months	no	acute vaginitis	nervous	none	none
M	27	investment counsel	R	3 weeks	no	none	normal	none	none
M	38	insurance salesman	R	4 months	yes	none	normal	none	none
F	28	none	R	6 months	no	bleeding hemorrhoids	normal	none	none
F	35	nurse	R	8 months	no	none	normal	none	none
F	67	housewife	RV	3 years	yes	senile vaginitis	nervous	none	cholecystectomy
F	67	housewife	R	3 weeks	no	external skin tabs	nervous	none	oophorectomy
F	82	none	R	8 years	yes	hypertension—cardiac	normal	none	none
M	54	sales	R	9 months	yes	gastric ulcer—mucous	high-strung	none	colostomy
M	37	chauffeur	R	1½ years	yes	none	normal	none	none
F	44	housewife	R	3 months	yes	none	nervous	none	none
M	46	laborer	R	10 months	yes	none	normal	none	none
M	48	drug clerk	R	2 months	yes	none	normal	none	none
M	36	waiter	R	4 months	yes	int.-ext. hemorrhoids	normal	none	hemorrhoids injected
F	71	home	RV	2 months	no	diabetes (controlled)	nervous	none	none
M	40	houseman	R	3 years	yes	none	normal	none	none
M	68	retired laborer	R	1 year	yes	prostatitis	nervous	asthma	none
M	32	clerk	R	2 months	no	none	normal	none	none
M	61	salesman	R	4 months	yes	sarcoma of buttock	nervous	none	biopsy
F	42	housewife	RV	7 weeks	no	cystoceles, rectoceles	normal	none	none
M	29	clerk	R	6 months	yes	no	nervous	none	append.

R = Perianal. RV = Combined perianal—perivulval distribution.

ment. In general, this investigator's findings can be summarized as follows:

1. A high percentage of the cases were relieved, many totally so. Only three of the patients failed to respond.

2. The shortness of time required to bring about relief both subjectively and objectively is considered important. The majority experienced vast improvement in from two to three weeks.

3. In comparison with reports of others on the use of local treatment, the results obtained with the cod liver oil ointment seem superior.

4. The ease of application and the advantage over suppositories is a factor much appreciated by the patient, and tends to make for better cooperation.

5. The safety of the medicament is to be stressed. There have been no allergic or toxic manifestations noted.

Conclusion

PRURITUS ANI is a very common and distressing rectal condition.

2. The multiplicity of the causes has been stressed.

3. The number of forms of therapy advocated for the relief of pruritus ani are described and commented on.

4. The etiology is tabulated into predisposing, indirect and direct causes.

5. A description of the pathology is given. Cod liver oil ointment as a local therapeutic agent is discussed and a new mode of administration is described.

6. Twenty-nine cases are reported in which this new form of cod liver oil ointment was used as an adjuvant treatment.

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Appearance of Involved Region at Start of Therapy	Length of Rx	Frequency of Rx	Comment
Circular area of inflammation with edema. Small protruding hemorrhoid.	1 week	4 × daily	C. R. Hemorrhoid injected with 5% phenol in cottonseed oil.
Denudation of perianal region with secondary infection. Quite moist.	10 days	3 × daily	Marked relief, but not complete. Hemorrhoids injected.
Deep excoriation anterior to anus. Moist thickened skin associated with erythema.	2 weeks	4 × daily	C. R. Hemorrhoids injected.
Three internal hemorrhoids, relaxed sphincter, radial excoriations.	3 weeks	4 × daily	C. R. Hemorrhoids injected.
Leathery perianal tissue, dry, scaley and excoriated. Intertrigo between buttocks.	3 weeks	3 × daily	Better than 75% improved.
Mildly thickened excoriated perianal region. Protruding internal hemorrhoids.	4 weeks	4 × daily	C. R. Hemorrhoids injected.
Weeping edematous pale skin. Increased folds, numerous excoriations.	3 weeks	3 × daily	C. R.
Extremely thick perianal skin, white, and excoriated.	10 weeks	4 × daily	No relief even though area was infiltrated with 90% alcohol.
Extensive cellulitis with extreme excoriation and secondary infection.	2 weeks	4 × daily	Patient also received adequate vaginal treatment.
Pale, peeling, boggy, excoriated.	1½ weeks	3 × daily	C. R.
Moist thickened edges reddened with excoriations and numerous radial folds.	5 weeks	2 × daily	Almost complete relief.
Red radial folds, wet.	3 weeks	1-3 × daily	Complete relief. Hemorrhoids injected.
Acute cellulitis around anus. Diaper-rash over buttocks.	1 week	3 × daily	C. R.
Leathery, thick and dry.	10 weeks	3 × daily	No relief.
Deeply pigmented, dry, leathery, multiple radial folds. External hemorrhoidal tabs.	3 weeks	3 × daily	C. R.
Leathery thickening of skin, many moist radial folds, pale color.	7 weeks	2-3 × daily	C. R.
Edematous, boggy, slightly indurated skin. Several raw excoriated linear areas.	7½ weeks	4-6 × i.d.	C. R.
Slightly thickened, pale shiny skin, moist. Excoriated.	3 weeks	3 × i.d.	"Almost gone".
Some erythema and thickening. No excoriations. Moist.	5 weeks	1-2 × i.d.	C. R.
Markedly thickened, leathery, moist, many excoriations. Pale color.	8 weeks	1-3 × daily	Much better and freedom from signs and symptoms 90% of time.
Skin normal in appearance except for excessive moisture. Quite hairy over itching area.	3½ weeks	1-2 × daily	C. R.
Moist thickened skin, pale with numerous radial folds and excoriations.	4 weeks	1 × daily	C. R.
No change noted in skin from normal.	2 weeks	4 × daily	No relief.
Slight thickening of skin, erythematous, moist, with radial folds. A few excoriations.	4 weeks	3 × daily (irreg.)	Almost complete relief.
Very thick, boggy, pale skin, heaping up of skin around hair follicles. Moist.	3 weeks	1 × daily	C. R.
No change noted from normal except for increased moisture.	4 weeks	1-2 × daily	C. R.
Shiny red, hard raised zone to right of anal opening with sinus draining foul B. coli put into the itching area. Remainder of skin around sarcomatous swelling normal.	5½ weeks	3 × daily	Relief great but not complete (beter than 50%).
Skin normal except for excessive moisture and slight pigmentation.	6 weeks	1-3 × daily	Almost gone.
Pale, edematous thickened skin, radial folds, numerous excoriations. Very moist.	5 weeks	1-2 × daily	C. R.

C. R. = Complete relief.

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Industrial Ophthalmology

—And Otolaryngology—

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Davenport, Iowa

I HAVE been prompted to take as my subject Industrial Ophthalmology and Otolaryngology for two reasons: first, because of the unprecedented production by industry in war work, and, second, because there is a great deal of decentralization in this effort and many participating plants are not large enough to support full-time medical staffs. They are without the larger metropolitan areas and must depend for their medical and surgical services upon men who are primarily private practitioners, and in our own field men who in that capacity embrace both ophthalmology and otolaryngology.

I make no pretense of submitting anything new or startling but rather offer some of the impressions of one who has been for years associated with industrial medicine as a part of his private practice. Time does not permit a complete survey of such a large subject, and if I seem to discuss what appear to be trivialities I would remind you that the proper care of the trivialities in medicine is the best preventive medicine that we have to avoid major complications. I, also, take refuge in the memory of an evening in Chicago some years past when the guest speaker of the evening devoted practically his entire time to discussing the proper care of the punctum lachrymalis. The speaker was a man whom I considered one of the outstanding clinicians of his time in his own field of medicine, the late Dr. Harold Gifford.

The conservation of public health is recognized as a governmental obligation. Legislation relative to the duties and responsibilities of the employer and the rights of, and compensation that may be due the employee are but a part of this program. Not only is clarifaction of such legislation needed in many states but the lack of unification of the various state laws still leaves much to be accomplished. Industry and carriers of accidental risks have for a long time looked to the medical profession for guidance. It is true that surveys have in the past been conducted by the Life Extension Institute Eye Conservation Council and other agencies. B. E. Kuechle, claims manager and vice-president of the Employers Mutuals of Wausau, Wisconsin, in a paper before the Wisconsin State Medical Society in 1938, stated, "The vital bearing of sense defects on the efficiency of individual producers must no longer be overlooked. I am sorry to report that in looking for guidance from the medical profession in this problem, leadership has until at least very recently been decidedly lacking."

The committee on compensation from the Section on Ophthalmology has given us for a number of years a standard by which one can speak with some authority as to visual defects. We now have the report of a group of consultants of the Council on Industrial Health endorsed by the Section on Laryngology, Otology and Rhinology of the A. M. A. which has submitted a tentative standard for estimating the percentage of useful hearing loss. These constitute a basis from which to apply medical knowledge. Abstract medical standards are but part of the picture. Actual findings may be at variance with medical standards. The reasons for the same are necessary in completing any industrial survey.

The work of the Council on Industrial Health is the means by which practical medical leadership can be provided. It is surveys such as conducted by Dr. Hedwig S. Kuhn[1] that point the way to the practical application of medical knowledge. The able leadership of A. C. Snell in ophthalmology and W. E. Grove in otolaryngology as committee chairmen facilitate the correlation of the findings of their committees with studies as made in the placement of the industrial employee under the direction of Joseph Tiffin, Ph.D. of Purdue University. As Tiffin[2] states, "visual patterns can be established that will make for success for a specific job but visual patterns are not the same for all jobs." Kuhn found that distant acuity of vision was no measure of individual efficiency at close range jobs.

Grove,[3] after studying statistics from the State Industrial Commission of Wisconsin and from the Michigan Department of Labor, concluded that the person who is hard of hearing is if anything less susceptible to injury than the person with good hearing.

A. G. Kammer,[4] medical director of the Inland Steel Corporation, stated that during a six-weeks period, with the dumbest lot of employees and turning out the greatest amount of steel per employee, there was the lowest accident incident in the history of the company. On asking the safety director for the reason, he replied, "Doctor, if I knew we would keep on doing it." The industrial surgeon must realize that arbitrary medical standards alone are not the answer to industrial needs. Pre-employment examinations and the correction of refractive errors through a cheap contract with some optical company likewise fail in answering the visual problem. The prospective employee who fails to meet a visual standard is entitled not only to a refraction but also the diagnosis of any eye pathology that may be present. The economic factors preclude an individual examination of every prospective employee by an ophthalmologist. Screening tests properly supervised can successfully weed out and select for complete examination those with substandard vision. The ophthalmologist must in his turn be placement program minded, he should know his industry, he should try to help the man to a job at which he can be successful and provide for industry a possible efficient and valuable employee in his particular placement. Rechecking of vision and hearing at intervals provides a basis for computing compensation losses due to accident as well as revealing that the individual may be in need of additional remedial measures.

Quoting Snell,[5] "The correct basis for evaluating vision is the measure of the efficiency or usefulness of the eye in performing its normal physiological function and this in terms of percentage."

We are not primarily interested in the economic deductions relative to earning power after the functional disability has been computed. Such decisions are not our province, yet our opinions are asked. The environmental conditions are not such a factor in visual dis-

Address given by invitation at the 103rd Annual Meeting of the Illinois State Medical Society, Chicago, May 18, 1943.

abilities but are in losses of hearing. We may test with tuning forks and the audiometer, but it is the perception of the human voice as a means of communication that is paramount to the individual. This perception varies with the voice and with the surrounding noise level. When we can devise a means of simulating the noise level of the man's job and then test him with a recorded standardized human voice we will have a practical test of hearing deficiency.

The industrial surgeon should be aware of his rather unusual status. While assured of his compensation from the employer or his agent, a casualty insuring company, he has a position that transcends that of an employee. So far as the patient and his accident is concerned, he is first and all the time his doctor. The application of his knowledge and skill differ in no way from services that he might render his private clientele. More than just rendering this service he should by his attitude try to make the individual conscious of this relationship. Once established in the patient's mind it is not only a factor in aiding the patient's recovery but also in maintaining satisfactory relationships between employer and employee. The industrial surgeon has another role as an ally of the safety engineer. The American workman will cooperate better when convinced than when ordered to comply with certain rules issued to reduce the hazards of his job and for his individual protection. With a knowledge of those hazards the surgeon can well devote a little time in personal conversation with the injured employee as an effective part of an educational program. An official visiting inspector of one of the local plants was recently a patient. Suggesting that his safety glasses should have incorporated his new refractive correction, he demurred, stating he did not use them much. I said to him "You ought to be fired. How can you expect employees to cooperate and conform to safety rules for their protection when you persist in violating those same rules." I meant it and he knew I meant it. He said "You're right," and I think I made a Christian out of him.

The question of the non-compensable hazards of industry needs clarifying. If there is a question of doubt it should be decided in the favor of the employee. Epidemic kerato-conjunctivitis, which has of late received so much attention, is an example of a disease together with simulating forms of conjunctivitis that needs clarification as to compensability. First-aid stations have no right to send doubtful cases to the surgeon without explaining to the employee that there is a question as to the compensability of his condition and that he is being sent to the doctor for a decision. If the employee is simply given an order to report, he assumes he is going to be taken care of. To be told otherwise by the surgeon destroys the proper patient-physician relationship. Let it be said to the credit of the casualty insurance companies with whom I have had contact that without exception they endorse the sentiments here expressed. They profit through safety engineering, they profit by good medical care, they want facts and good diagnoses and not biased medical opinions.

Just as clearly defined is the industrial surgeon's responsibility to the employer or his agent. The surgeon is the employers main line of defense against malingering. Inconsistencies between subjective and objective findings more often give the first hint of possible malingering. In this connection a full history and statement of the accident, cause and degree of disability by the patient may later be a bulwark of defense against fraudulent claims. At the time of the accident the thought of excessive claims has rarely entered the minds of the injured employee or his family. Time does not permit a recitation of malingering tests which are readily available, and I would rather speak of the psychological approach. The surgeon must be aware that there is a recognized distinction between malingering and post-traumatic neurosis, in spite of the fact that the final financial settlement is necessary for the cure of each. In the former world war I learned a valuable lesson when given the authority for some time in one of the camps relative to the acceptance or rejection of inductees because of visual defects. What might be termed a solicitous sympathy by the physician with the individual and his claimed defect is a powerful factor in disarming him. It is like giving a man enough rope with which to hang himself. Once malingering has been established, one must still use diplomacy in bringing about final capitulation. The army method would hardly apply to civilian life.

Medical literature does not supply all the answers. One must use his own wits and ingenuity. I recall a personal case in point. Following a fall, and this was before our present compensation laws, an employee brought suit in a large amount for impaired vision of his right eye. There was no demonstrable eye pathology, the vision was as claimed and the condition diagnosed as an amblyopic eye of long standing. A friendly attitude having been adopted, the professional visits became friendly chats. I learned of his hobbies and his recreations. Hunting was his principal sport. The fact that he was right-handed was established by his writing and the like without his knowing they were really part of his tests. While chatting with him about one of his hunting experiences I suddenly said to him "You have always shot from the left shoulder, haven't you?" His quick affirmative reply was all that was needed to collapse his entire case. Yet one can be hoisted on his own petard, for years later my medical testimony relative to a right eye pathology, which I still feel far antedated a claimed accident, was nullified by a lawyer who brought in three odd looking witnesses to testify that prior to the alleged accident the plaintiff had always shot from his right shoulder.

In the aural field with claimed total loss of hearing, the malingeer may outwit the examiner and eventual exposure may depend on plain detective work. Claims for partial loss of hearing are not so difficult to establish.

The Stenger test is as reliable as any, but I have found a rechecking of audiometer graphs and the use of the audiometer malingering apparatus give one the best permanent record of inconsistencies between subjective and objective findings. As previously stated, we have fairly well established standards for the determination of visual losses due to accident and have made a creditable beginning relative to hearing losses. We have no scale for the auxiliary functions of the eye, ear, nose and throat, as the action of the lids, lachrymation, lack of normal muscle balance and facial disfigurement.

The same applies to the nose. I have had during the past year a case of traumatic essential anosmia in a professional cook. The insurance adjuster came to me and asked "On what basis can I approach this claimant with a fair offer of settlement?" I replied that I could not tell him but he had better be prepared to be willing to pay a substantial sum, for if a professional cook who could not smell ever got into court she could probably establish her right to a very material compensatory award.

Permanent damages to the membrane tympani as caused by flying molten particles with direct evidence of accompanying burns of the canal wall do occur. I have had two such cases during the past year in which the evidence of the burns was present but no metallic particles were found. The compensatory damage is a matter of personal opinion.

Proper lighting, more perhaps in the province of the safety and lighting engineer, is important in the prevention of accidents. J. MacNalty[6] states that the Medical Research Council on Miners Nystagmus after prolonged investigation concluded that poor lighting was the essential factor in producing this condition. Thomas Allen has stated that surveys have shown an increase of accidents in plants with the onset of darkness.

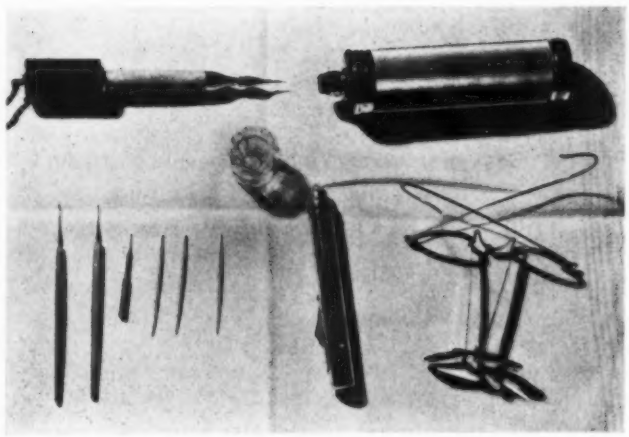
Quoting Leonard Greenburg,[7] approximately 300,000 accidents occur to the eye in American industry each year and of this number compensation is paid in approximately 60,000 cases. He estimates the direct cost between 30 and 37 million dollars and with the indirect cost a total of approximately 60 million. I am in no position to question such figures but feel sure that in my own practice the proportion of compensable eye injuries does not attain anywhere near such a high percentage rate.

Allen and Carmen[8] state that 80% of all eye accidents are due to flying fragments, mining and quarrying having the highest percentage of severity in eye accidents. Allen also states that approximately 40% of industrial eye accidents occur when working with abrasive wheels and metal working machines. Certain it is that by far the greatest number of patients the average ophthalmologist will see with industrial eye injuries are those of minor significance, caused by small flying particles lodging or imbedding themselves in the cornea. The surgeon has not only the responsibility of the proper care of these trivial accidents, but also the elimination of a possible, more serious injury and, what is often forgotten, a responsibility to industry to reduce within the limits of safety to the individual the loss of man-hours of work.

WITHOUT attempting a complete dissertation of the care of minor eye injuries I would like to call attention to a few of the essentials and stress some procedures in which the literature seems to lack unanimity of opinion.

First-aid stations, unless equipped to render their service aseptically, should leave all corneal injuries alone. If so equipped they should be instructed to limit their services to the most superficial foreign bodies that are removed by very light brushing with a sterile moist cotton-tipped applicator. Referred to the ophthalmologist, there is first the history of the accident. Not only the location of the foreign body, but also the notation and location of old scars and the presence of any chronic inflammation are important. Give the local anesthetic of choice time to act. As is well known, the most superficial injuries are often the most painful. Abrasions not seen without staining may be extremely painful. Hot foreign bodies, as from a grinder's wheel, may anesthetize the cornea so that the individual may not be aware of any irritation for several hours after their striking the cornea. The educational campaign includes telling the individual of the importance of early attention, without scolding him because of a delay due to his not being aware for several hours that his eye had been injured. Contusions with negative corneal findings demand careful ophthalmoscopic examinations. A softened eyeball portends a serious ocular injury. Penetrating foreign bodies may cause only momentary discomfort. Any abnormal eye condition associated with an injury which cannot be explained by the superficial position of the foreign body itself demands an x-ray. A small hemorrhagic area of the ocular conjunctiva, associated with an ocular injury even without any apparent scleral injury deserves x-ray investigation. X-rays for intra-ocular foreign bodies should be taken not only to establish but also to eliminate their presence. Casettes, pasteboard filmholders and screens may accumulate opaque foreign particles. Exposures for ocular foreign bodies taken with the film only in its original paper covering gives less chance for confusing shadows due to extraneous particles of opaque material. During the past year I recently had a film reported as negative. There were several tiny light spots on the film reported as due to the cassette. A second film properly taken revealed the intra-ocular foreign body, one of the light spots in the first film having been the foreign body. Penetrating corneal wounds with a definite history of cause precluding the possibility of an intra-ocular foreign body and with a small iris prolapse or synechia demand immediate attention as an office procedure in preference to a possible delay due to hospitalization. If in the extreme periphery, the strongest myotic treatment is started without delay. If not near the periphery the strongest mydriatic treatment, even to the subconjunctival injection of atropine and adrenalin, is used. The corneal wound is left absolutely alone for an hour after the first eserine or mydriatic, until the pulling effect on the iris has been established. Then careful manipulation of the corneal wound will often release the iris and the drug action will pull it away from the wound. The success of this technique depends largely on how early it is instituted. Small synechia which persist should be left until the eye has become quiet, when practically the same results may be accomplished with a knife needle.

The removal of the corneal foreign body carries with it the dicta, the deeper the body, the more permanent the scar; infected wounds mean more scarring; and a peripheral scar may not of much moment, but a central scar is always of moment. The binoccular loupe and the electric lighted condensing lens are necessities. Oblique illumination from various angles is necessary to assure one of the complete removal of the foreign body and surrounding corneal debris. Two types of eyes spuds are necessary, the pointed and the flat type. Indiscriminate scratching at a foreign body is to be condemned. Careful loosening and removal *en masse* is the desideratum though not always achieved. Charred corneal tissue surrounding a foreign body continues to act as a foreign body. There seems to be some controversy as to the desirability of its immediate removal. I have heard an ophthalmologist whom I greatly respect condemn the corneal burr, his contention being that in a few days nature will so soften the surrounding tissues that the removal will be facilitated and with less eventual scarring. I wonder if he is not partly right and partly wrong. The hand burr used indelicately had better not be used at all. Deep in the corneal stroma it has a distinct risk. But with charred corneal tissues more or less superficially located, continuing to act as a foreign body exciting inflammatory reaction and increasing vulnerability to infection, I believe its early removal is desirable. The hand burr, or better still mounted in a Green motor-driven trephine instrument, can be used with great delicacy of touch under loupe inspection and proper illumination. The early removal of this tissue is advocated in order to facilitate more rapid healing, lessen the danger of infection and without increasing the after scarring. I have found the round sharp-pointed toothpick covered with a very small amount of thoroughly dampened cotton a valuable adjunct in cleaning out the corneal area. Dry cotton should never be used; the fibers catch on the edges of the corneal wound. In the technique I have found that making two cotton finger cots moistened with an antiseptic solution of your choice and placing one on the third finger of each hand give two practical lid retractors. The first finger and thumb of each hand are free, the left to handle the light and the right for the instrument. Efficient work can be accomplished even



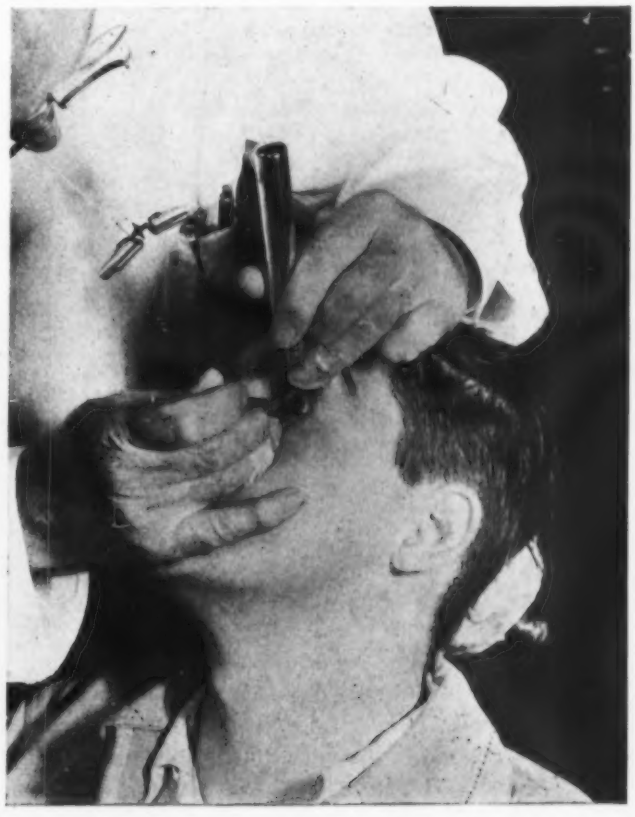
without an assistant. I find myself at variance with the generally expressed opinion to obtain the vision at the first examination. It is the vision at the time of recovery that is important. If the foreign body is so superficial that a second visit will probably not be required the vision is recorded. If not normal or not otherwise explained a second visit is ordered. The ordinary corneal foreign body patient should be seen again. The patient is asked whether his vision is affected. If he complains of decided blurring it is investigated. If not he is told that his return is requested for his own protection, that a record of his vision on recovery is for his benefit. It is true that some men do not return. If they do not it is so reported on the insurance report, but I believe that for future records it is unfair to the employer to have recorded a subnormal vision that is no criterion of the actual vision, and which has not been later corrected because the man did not return as requested. Always evert the lids and always look over the other eye. You may save yourself some embarrassment, if nothing else.

The after cure and the use of an eye patch find a difference of opinion. Walker and Auten,[9] speaking of corneal foreign bodies, state that under no circumstances should an eye be bandaged or a patch applied. The more generally given advice is to use the patch, some even continuing its use until there is no staining of the cornea. Quoting from Behrens,[10] "The Eye and Its Diseases," "The lachrymal secretion is a mild soothing neutral solution and an effective germicide. The active substance is probably a lypozyme, a colloid found in most issues, abundantly in the tears and in small quantity in the white blood corpuscles. It is destroyed by heat at 75 C and acids and alkaloids. Its concentration is sufficient to kill the most common pathogenic cocci."

Here we have a surface under natural conditions being bathed by the most ideal of germicidal solutions —a surface from which there is the freest drainage and where the slight irritation and act of winking act as stimuli for the production of the neutral germicide solution. The set-up certainly conforms to the surgical principles favoring healing. Yet practically immediately after the removal of a foreign body many patients feel more comfortable with an eye patch. Personally I feel that perhaps a middle of the road course is more desirable, and I have never seen any harm from the moderate use of the eye patch. I feel my responsibility relative to this patient's man-hours of work. Many plants will not accept a man back on the job with an eye patch. If seen during working hours and the foreign body is very superficial he is sent back to work without any patch. If the eye feels irritated an ointment and patch are applied for a couple of hours. Instructions are given that if after a couple of hours the patch is removed and his eye feels comfortable without light sensitivity he can return to the job. If later in the day, the man is told to remove the patch before retiring; that in the morning if there is apparent recovery he can report for duty. He is to report for a check-up. The fact that there is a tiny area that might stain is largely disregarded. It is the clinical subjective symptoms that are the principal guiding signs.

Coincidental acute sinus inflammation associated with trauma makes difficult the causative relationship of each to serious post-traumatic infection but does not materially change the responsibility as to the individual case.

The causative relationship of chronic sinus disease following trauma is a much more difficult question to answer. The lack of a good or reliable previous history, and being thereby forced to assume there was no pre-traumatic disease present, often means an opinion based on a false premise. Hearing losses, tinnitus and vertigo associated with injuries about the ear, mastoid or skull are a perplexing problem. Can the cochlea be injured to produce partial loss of hearing? Can the



labyrinth be injured to cause partial loss of function? Medical literature, while favoring an affirmative answer, still leaves one unable to make dogmatic statements. The hearing loss may be established but the industrial loss is most difficult of evaluation.

Obtaining a careful history of the onset and sequence of symptoms relative to the internal ear is of first importance. The spontaneous signs of vestibular disturbance, nystagmus, vertigo, past pointing and falling are of first significance in establishing a causative relationship to the trauma. The induced reactions, while important to verify subjective complaints, are possibly more important when reactions are normal to eliminate the internal ear as the source of the disturbance.

Industrial medicine is more than just practicing medicine. It is not laying down medical dicta, but rather the practical application of medical knowledge to the needs of industry.

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Automotive Medical Panel

TO FACILITATE the exchange of information about new problems of employee health and safety arising from the increasing employment of women and rehabilitated war veterans in automotive industrial plants, a medical panel composed of factory staff physicians has been organized for the Automotive Council for War Production. In announcing the inauguration of this service, GEORGE ROMNEY, managing director of the Automotive Council, said that the group's initial action already undertaken would be the cooperative study of questions relating to causes of dermatitis, medical standards governing the employment of women, the special problems of such handicapped workers as disabled war veterans, industrial fatigue and the use of vitamin pills. Members of the panel include DR. JOHN J. PRENDERGAST, chairman, Chrysler Corporation, DR. A. W. GEORGE, Packard Motor Car Company, DR. FRANK J. JARZYNKA, Bohn Aluminum & Brass Manufacturing Corporation, DR. WM. J. KREBS, Hudson Motor Car Company, DR. H. L. KRIEGER, Ford Motor Car Company, DR. CLARENCE H. KUHLMAN, Cleveland Graphite & Bronze Company, DR. CLARENCE D. SELBY, General Motors Corporation. Alternates include DR. STUART F. MEEK, Chrysler Corporation, and DR. J. ZEMENS, Packard Motor Car Company.

The medical panel is an extension into a new field of the industry's wartime practice of sharing and exchanging information on methods and new developments, MR. ROMNEY said. "We are hopeful that it will contribute as much to the industry's effort to expedite the output of products for the fighting forces, as has been contributed by similar collaboration in such varied fields as tooling machine tools, materials engineering production, salvage contract termination and personnel practices."

Currently numbering seven, the panel is being enlarged to a membership of 12. To the more than 500 manufacturing companies now participating in the Council's cooperative activities it will bring the benefits of the production experience of some of the nation's foremost industrial physicians.

Industrial Hygiene Foundation

—Eighth Annual Meeting: Preliminary Program: November 10-11, 1943, at Pittsburgh—

THE eighth annual meeting and second war conference of Industrial Hygiene Foundation will be held at Mellon Institute, Pittsburgh, November 10-11. Theme of the meeting is Maintain Manpower!

The program, geared to the management level for the hundreds of industrial executives who attend, features a panel on Putting Disabled War Veterans Back to Work. DR. C. D. SELBY, Medical Consultant, General Motors Corporation, will preside, and representatives of industry and government, experienced in rehabilitation, will participate.

A score of subjects, urgent for the maintenance of manpower in war-pressed industries will be discussed under the medical and engineering section of the program. Attention will also be given to pertinent legal developments of the year respecting industrial health.

The preliminary program follows:

Wednesday Morning, November 10

ANDREW FLETCHER, Chairman, Board of Trustees, JOHN F. MCMAHON, Managing Director. The Foundation Reports to its Members.

Keynote Address—CHARLES F. KETTERING, Vice-President, General Motors Corporation.

"Putting the Disabled Veteran Back to Work"—Panel Discussion. Presiding: C. D. SELBY, M.D. Medical Consultant, General Motors Corporation. (Three or four participants including representatives of industry experienced with this all-important problem now confronting management.)

Wednesday Afternoon

LIEUT. COL. A. J. LANZA (MC), Chief, Occupational Hygiene Branch, U. S. Army, presiding:

"How the Inhalation of Some Chemicals Affects the Eye"—CHARLES F. KUTSCHER, M.D., Medical Adviser, Industrial Hygiene Foundation.

"Recent Data on Health Hazards in War Industries"—LIEUT. COL. W. J. MCCONNELL (MC) and R. H. FLINN, M.D., Safety and Security Branch, U. S. Army.

"Fluorides as an Industrial Health Problem"—ROBERT A. KEHOE, M.D., Director, and EDWARD J. LARGENT, Kettering Laboratory, University of Cincinnati.

"Findings from an Eight-Year Observation of the Chests of Welders"—O. A. SANDER, M.D., Medical Committee, Industrial Hygiene Foundation.

"Effects of Aluminum Therapy on Silicotics; Relation of Heart Disease to Silicosis"—L. U. GARDNER, M.D., Director, and GEORGE M. WRIGHT, M.D., The Saranac Laboratory.

Thursday Morning, November 11

HEALTH Problems of Women in Industry (Findings from a Foundation supported Plant-to-Plant Study)"—C. O. SAPPINGTON, M.D., Industrial Health and Hygiene Consultant, Chicago.

"Health Problems of the Older Employee and Employer"—EDWARD J. STEIGLITZ, M.D., Washington, D. C.

"Saving Lost Manpower (Including Results of a Foundation-U. S. Public Health Service Study)"—W. M. GAFAFER, SC.D., Senior Statistician, U. S. Public Health Service.

Engineering Section

PHILIP DRINKER, Harvard School of Public Health and Chief Health Consultant, U. S. Maritime Commission, presiding:

"Control of Health Hazards in Shipbuilding, Including

Weldings"—PHILIP DRINKER, Chairman, Foundation's Preventive Engineering Committee.

"Control of Newer Hazards in War Plants"—ALLEN D. BRANDT, Sanitary Engineer, U. S. Public Health Service.

"Report on Highpoints of Foundation Plant Surveys"—FRANCIS R. HOLDEN, PH.D., and W. C. L. HEMEON, M.S., Industrial Hygiene Foundation.

Thursday Afternoon

PHYSIOLOGICAL Effects of Heat"—LIEUT. COL. T. F. HATCH, S.C., Armored Force Medical Research Laboratory, Fort Knox.

Legal Section

T. C. WATERS, Mullikin, Stockbridge & Waters, Baltimore • Maryland, presiding:

"Legal Developments in 1943 Respecting Industrial Health"—T. C. WATERS, Chairman, Legal Committee.

A second legal discussion to be announced.

"Healthful Working Conditions Improve Labor Relations"—speaker to be announced.

The Therapeutic Value of Electrically Activated Ergosterol when Administered Intramuscularly

—A Preliminary Report—

R. GARFIELD SNYDER, M.D., F.A.C.P.,
WILLARD H. SQUIRES, M.D., F.A.C.P.,
JOHN W. FORSTER, M.D.,
and
EMMANUEL RUDD, M.D.,
Arthritis Clinic, Hospital for Special Surgery, New York City

IN PREVIOUS communications,[1,2,3,4] we described the results obtained during six years of research with the oral administration of electrically activated vaporized ergosterol* (Whittier process) in the treatment of chronic arthritis. The present report presents the clinical and laboratory data in a group of 31 patients who received weekly intramuscular injections of this same form of electrically activated ergosterol.

The indications for the parenteral administration of any medication are well known. It hastens and assures absorption, prevents digestive upsets, especially when pathologic conditions of the gastro-intestinal tract exist, gives the physician an opportunity to study his patient more completely and more frequently, makes certain that the required dosage is received and eliminates the necessity of depending upon the patient to take the medication in adequate doses at the prescribed regular intervals.

In our earlier reports we discussed the high incidence of hypochlorhydria, achlorhydria, disturbed liver and gall-bladder function, impaired gastro-intestinal mobility and the early occurrence of generalized arteriosclerosis in untreated cases of rheumatoid arthritis.

It is not surprising therefore to find that in treating any large group of arthritis cases, one not infrequently encounters a certain number of patients whose gastro-intestinal disturbances interfere with effective oral medication. In such patients, as well as in arthritic patients in general, it seemed advisable to study the value of parenterally administered preparations.

The safety of parenteral injections of Ertron was established first in rats and dogs. These preliminary trials with animals indicated that the dosage recommended for oral administration could very safely be administered parenterally. In no case was there any sign of either local or systemic reaction.

*Ertron: This product was supplied to us for this clinical investigation through the generosity of Nutrition Research Laboratories, Chicago, Illinois.

In the present clinical investigation, we attempted to determine the therapeutic value of Ertron when administered intramuscularly. Thirty-one patients who had been afflicted with severe chronic arthritis and who had failed to respond to one or more accepted forms of therapy were given intramuscular injections of Ertron at weekly intervals. After experimentation, the mode of administration which proved most effective was to inject deep into the gluteal region 500,000 units of Ertron the first week. One week later, 1,000,000 units were injected and thereafter the dosage was increased according to the requirements of each patient. Each ampule contained 500,000 U.S.P. units of Whittier process vitamin D.

In general, the procedure used was similar to that described in our previous reports.

Results

CLINICAL: Chart I describes the clinical course of each patient before, during and after the intramuscular injections of Ertron, the response, if any, to previous therapy and the results obtained with the present management of the patients. In some patients, definite signs of improvement were observed in from two to four weeks; in others, however, there was no demonstrable effect until after three months of treatment.

The first manifestation of the therapeutic effect was an improved sense of well-being, increased appetite, a more normal mental state, more restful sleep, less pain and, in almost every case, the patient became very much more optimistic. Following this, there was frequently a decrease of soft tissue swelling, increased range of motion and in some of the patients complete disappearance of all arthritic symptoms, even after the patient returned to full-time occupation. In no case did the intramuscular injections cause any gastric distress.

BLOOD STUDIES: The calcium, phosphorus, phosphatase, total protein, N.P.N., uric acid and sugar content of the blood, as well as complete blood count, were determined before therapy was started and at six-month intervals thereafter. There was no correlation between the blood findings and either the progress or severity of the disease. The levels of the chemical constituents of the blood were not significantly altered in any of the patients receiving the intramuscular injections of Ertron.

X-RAYS: There were no consistent osseous changes in the roentgenograms during the course of therapy. In some of the cases of rheumatoid arthritis in which there was a rarefaction of the ends of the bones, there occurred slight recalcification of these parts after Ertron was administered. In other cases, however, the decalcification of the bones remained unchanged during therapy in spite of very definite clinical improvement of the patient.

These observations on the clinical, chemical and radiologic findings are in absolute accord with our results previously reported on the use of Ertron when administered orally.[1,2,3,4]

Because of the abolition of pain and restoration of normal function in some arthritic patients in whom no change in the roentgenograms occurred, one cannot help questioning whether or not the pain and limitation of motion might not be due to changes in the periarticular soft tissue structures rather than to the osseous pathology. This question is now being studied intensively.

SAFETY: In our earlier investigations we found that Ertron when administered orally was a comparatively safe and effective form of therapy for the treatment of chronic arthritis.[1,2,3,4] Other investigators have repeatedly corroborated our findings.[5,6,7,8,9,10,11,12,13,14,15,16]

Clinical Chart—Ertron Parenteral Series

Case No.	Sex	Age	CHARACTERIZATION OF ARTHRITIS			COURSE BEFORE PRESENT THERAPY	PREVIOUS TREATMENT	
			Duration	Diagnosis	Extent of Involvement		Form	Response
A161 **I**	F	45	5 Yrs.	Rheumatoid	Shoulders, neck, hands, fingers, wrists, knees, ankles and toes.	Progressive. Pain started in knees, spreading to hands, wrists, ankles. For past 2 years, shoulders and neck affected. Partial limitation of motion of ankles, knees, toes. Great pronation of both feet. Cholecystectomy, appendectomy in 1941.	Private doctor Gold Mineral baths Physiotherapy Extraction of teeth	None Slight None None None
A145 **II**	F	29	7 Mos.	Mixed	Generalized pain throughout entire body, especially severe in hands, wrists, shoulders and right ankle.	Progressive. Pain started in shoulders, quickly spreading to all joints. Five months ago, swelling and pain markedly increased, especially in hands. Partial limitation of motions of hands, shoulders and wrists.	Sulphur Tonsillectomy Tenosynovectomy Bartholin cyst removed	Temporary Temporary
B357 **III**	M	50	15 Yrs.	Marie-Strumpell	Neck, shoulders, spine, hands, knees, feet and wrists.	Progressive. Symptoms started with slight pain in spine. Spine now held in lumbar and dorsal flexion. Eleven months ago feet and other affected joints became involved.	Vaccine Physiotherapy Tonsillectomy (tag removed later) Extraction of teeth	Questionable Slight
C284 **IV**	M	50	5 Mos.	Osteoarthritis	Shoulders, wrists, hands, knees and feet.	Progressive. Pain started in left hand. Swelling and pain in metacarpophalangeal joints of both hands (right more severe), spreading to other joints. Tonsillectomy in 1892.	Private doctor Internal medication Baths	None None None
D156 **V**	M	59	3 Yrs.	Mixed	Both knees, fingers and shoulders.	Progressive. Pain started in right knee, spread to left knee, then hands and shoulders. Walks with crutches and cane.	Physiotherapy Crowe's vaccine, Prontylin Gold Synovectomy-patellectomy Ertron (oral)	 Improved
D201 **VI**	M	29	13 Mos.	Rheumatoid	Pain in all joints of body; especially, shoulders, elbows, wrists, fingers, toes, knees and ankles. Slight pain in back and hips.	Progressive. Stiffness started in fingers of both hands. Two months later, pain and fusiform swelling of fingers, then gradual spreading of symptoms to other joints.	Treated at Army Hospital for 4 months with aspirin.	None
J53 **VII**	M	29	3 Yrs.	Marie-Strumpell	Low back and hips.	Progressive. Pain started in hips. Two or three months later, it spread to back; six mos. ago, centered in low back and hips. Unable to flex back with knees straight. Rigid dorsal-lumbar articulations.		
K301 **VIII**	F	22	10 Yrs.	Rheumatoid	All joints of body; most severe in hands, wrists, fingers, elbows and feet.	Progressive. Pain first started in wrists and fingers, spreading to feet and other joints. Patient has nodes, ulnar deviation, crepitus, atrophied clammy skin.	Tonsillectomy Orthopedic operation on feet	None
K310 **IX**	M	37	5 Mos.	Scleroderma (associated arthritis)	Hands, fingers, wrists, shoulders, right hip, knees and feet.	Progressive. In November, 1941, pain and stiffness in muscles around knees. Five months ago, patient felt pain in feet on walking any distance. Now, affected joints are painful, stiff and swollen. Skin of right hand is tight and shiny from finger tips to above wrists.	Vaccine Private doctor	None None
L292 **X**	F	54	20 Yrs.	Osteoarthritis	Hands, fingers, knees and feet.	Progressive with exacerbation and remission. Started in knuckles of both hands. Patient is unable to put on shoes. Pain and swelling most severe in hands.	Physiotherapy Paraffin baths (hands.)	None None
N67 **XI**	F	54	7-8 Yrs.	Marie-Strumpell	Neck, entire spine, left arm, left knee and both feet.	Gradually progressive; started in low back and spread to neck and other affected joints. Stands with perfectly rigid head and neck bent forward slightly. No motion in cervical spine; dorsal spine rigid.	Private doctors	Temporary
R243 **XII**	M	55	3-4 Yrs.	Mixed	Shoulders, elbows, hands, fingers, back, hips, knees and toes.	Gradually progressive but much more rapidly for past month. Walks with difficulty. Tonsillectomy in 1938; rectal operation in 1935.	Private doctor Coley's vaccine Gold Ertron (oral)	None Some Some
S550 **XIII**	M	25	2 Yrs.	Marie-Strumpell	Neck, spine, right shoulder, arms, hips and legs.	Progressive with remissions. Six months ago, back became very painful. In August, inducted into Army; spent 50 days in cast in hospital. Rigid spine; limited chest expansion. Flexion of hips; limitation of motion of neck.	Chiropractor Vaccine Physiotherapy Plaster cast Hospitalization (Army)	Some Some Some
S578 **XIV**	F	62	7 Yrs.	Rheumatoid	Generalized joint pain, especially in left knee, right knee, hands, left metatarsal arch.	Gradually progressive. For five years, joints only swollen. Two years ago, pain appeared in left instep, right hand and knee, spread 8 months ago to left knee. Double hallux valgus. Arches depressed. Sedimentation Rate: 105.	Physiotherapy	Temporary
S273 **XV**	M	51	2 Yrs.	Mixed	Feet, toes (left), left leg, left knee, cervical spine and chest.	Progressive. Acute onset starting in knees, toes, left leg. Feet show marked D.W.F. Marked synovitis of villous type present.	Vaccine: typhoid and autogenous Gold Sulphur Shock and fever therapy Hot Springs Short Wave Ertron (oral)	Slight None None None None

Clinical Chart—Ertron Parenteral Series

ERTRON PARENTERAL		TOXIC MANIFESTATIONS		CLINICAL OBSERVATIONS	REMARKS
Started Date	Weekly Dosage U.S.P. Units*	Local	Systemic		
12-16-42	1,000,000 to 1,500,000	None	None	Excellent progress. Patient now has complete use of fingers. Great reduction of swelling and pain of other involved joints.	Tonsils and paranasal sinuses possible foci of infection.
5-27-42	1,000,000 to 1,500,000	None	None	Patient improved. Working full-time in a defense plant.	
6- 3-42	1,000,000 to 1,500,000	None	None	Marked general improvement. Condition of back unchanged.	
1-13-43	1,000,000 to 1,500,000	None	None	Definite improvement. Working full-time.	Typhoid during childhood. Yellow fever inoculation in February, 1942. Jaundice, July, 1942. Teeth and tonsils probable source of focal infection.
5-28-42	1,000,000 to 1,500,000	None	None	General condition is now improved but his arthritis remains unchanged.	
1-19-43	1,000,000 to 1,500,000	None	None	Condition unchanged.	Tonsils and prostate possible foci of infection.
9-16-42	1,000,000 to 1,500,000	None	None	Excellent. Chest expansion increased two inches. Symptom-free. Working full-time.	
11-17-42	1,000,000 to 1,500,000	None	None	Condition unchanged. No improvement.	Many infected teeth.
4-13-43	1,000,000 to 1,500,000	None	None	No change.	Tonsils were infected; removed just prior to admittance to this Clinic.
4-27-43	1,000,000 to 1,500,000	None	None	Definite improvement. Less swelling and increased mobility of fingers.	Operation for tumor in 1934; removal of goitre and appendectomy in 1941. Infected tonsils present.
5-20-42	1,000,000 to 1,500,000	None	None	Slight, general improvement. Fair result.	Tonsils may be possible source of infection.
5-6-42	1,000,000 to 1,500,000	None	None	Patient says he feels better while taking parenteral Ertron.	Occupation as fish handler is contributing etiologic factor. Handled cold wet fish all day. On 6-22-43, patient changed occupation to that of food handler.
12-16-42	1,000,000 to 1,500,000	None	None	Slight improvement.	Chronic prostatitis. Tonsils probably infected; should be removed.
5-18-43	1,000,000 to 1,500,000	None	None	Improving although on treatment only two months.	
7-15-42	1,000,000 to 1,500,000	None	None	Unchanged.	

*Ertron Parenteral—electrically activated ergosterol (Whittier Process) for intramuscular injection. Each cc. contains 500,000 U.S.P. units Whittier Process Vitamin D.

Clinical Chart—Ertron Parenteral Series—Continued

Case No.	Sex	Age	CHARACTERIZATION OF ARTHRITIS			COURSE BEFORE PRESENT THERAPY	PREVIOUS TREATMENT	
			Duration	Diagnosis	Extent of Involvement		Form	Response
S457 **XVI**	F	39	12 Yrs.	Rheumatoid	Knees, ankles, toes, hands and wrists.	Progressive, especially for past 1½ years. Decrease of spinal curves. Marked restriction of both wrists; fusiform swelling of fingers. Objective symptoms progressing rapidly.	Tonsillectomy Gold Sulphur Crowe's vaccine Extraction of teeth Ertron (oral)	 Relief (Gold None
W217 **XVII**	F	65	13 Yrs.	Rheumatoid	Shoulders, arms, hands, back (on walking), knees and feet. Generalized joint pain.	Progressive. Onset followed pilgrimage to France, gradually becoming more painful. Tonsillectomy in 1923. Sinus operation in 1925.	Gold salts Physiotherapy Baths	None None None
C239 **XVIII**	F	40	4 Yrs.	Infectious	All joints of body; most severe in fingers, wrists, right shoulder, knees and ankles.	Gradually progressive. Pain started in right shoulder. Atrophy of muscles of hands and forearms. Unable to flex right 2nd or 3rd fingers and left 2nd finger.	Gold (20 injections) Physiotherapy Foreign protein Iron injections Diet Ertron (oral)	None None None None None None
C100 **XIX**	M	26	14 Yrs.	Rheumatoid	Hands, fingers, elbows, shoulders, hips, knees, feet and toes.	Gradually progressive. Pain started in fingers, together with stiffness and swelling. Walks with a limp. Roughening in both shoulder joints in region of acromioclavicular joint.	Vaccine, typhoid Tonsillectomy Operations on nose, hernia Ertron (oral)	None None None None
C272 **XX**	M	49	5 Yrs.	Marie-Strumpell	Pain in all joints of body; more marked in neck, shoulders, hands, hips, knees and feet.	Progressive. Completely stiff spine from sacrum to neck. Hips and neck limited in motion. Knees swollen, definite increase in synovial fluid. History of GC 20 years ago.	Very little previous medication Ertron (oral)	None None
D198 **XXI**	F	48	1½ Yrs.	Rheumatoid	Pain in hands, back, sacroiliac region and feet.	Progressive since onset which followed a severe sore throat. Has difficulty in getting up from a sitting position. Had sciatica 15 yrs. ago. Flexion of spine good.	Vaccine Lamp Ertron (oral)	None None
D49 **XXII**	F	47	18 Yrs.	Rheumatoid	Hips, knees, ankles, back, wrists, hands and fingers.	Steadily progressive with exacerbation and remission. Ankylosis of both hips; partial ankylosis of knees and ankles. Only moderate demineralization of bones. Uric acid: 5.4.	Cinchophen, Tonsillectomy Coley's vaccine Ertron (oral) Private doctors Physiotherapy	 Def. improv. None
G328 **XXIII**	F	44	3 Yrs.	Mixed, rheumatoid predominating	Shoulders, elbows, wrists, fingers, knees, ankles and groin. Generalized joint pain.	Gradually progressive. Started in left thumb. Pain and swelling in all joints for past year. Difficulty in walking. Fluid in left knee. Tonsillectomy in 1938.	Private doctor Vaccine Diathermy Ertron (oral)	None None None
K289 **XXIV**	F	48	21 Yrs.	Rheumatoid	Pain in all joints of body; most severe in hands and shoulders.	Progressive with exacerbation and remission. Pain first appeared in left thumb; two years later, spread to knees, then hands and shoulders. Limitation of motion.	Vaccine Physiotherapy Ertron (oral) Cock-up splints for wrists Paraffin baths	None Slight Slight
K258 **XXV**	F	36	2 Yrs.	Rheumatoid	Pain throughout body from neck to toes; most severe in left leg.	Started with swelling of fingers and ankles. Acute onset at time of pregnancy. Considerable synovitis with some fluid. Patient is a nervous problem. Has enlarged thyroid.	Aural sulfide Salicylates Extraction of teeth Ertron (oral)	Temp. impr. Worse
L221 **XXVI**	M	24	5 Yrs.	Marie-Strumpell	Hips, left sacroiliac and knees.	Gradually progressive with exacerbation and remission. Forced to stop work as busboy because of pain. History of GC in 1939. Kline test negative now.	Physiotherapy Ertron (oral) Tonsillectomy (1942) Sacroiliac strapping	None None None Temporary relief
R252 **XXVII**	F	59	5 Yrs.	Osteoarthritis	Shoulders, fingers, knees, cramps in legs. Generalized involvement of entire body.	Slowly progressive. Pain first started in knees. Early Heberden's nodes. Partial limitation of motion with severe pain and swelling in all joints.	Hospitalization Physiotherapy Ertron (oral)	None Temp. relief
S518 **XXVIII**	F	35	6 Yrs.	Rheumatoid	Generalized involvement of entire body.	In 1935, pt. had grippe, rheumatic fever. Better for one year, then patient had tonsillectomy, followed by flu, pleurisy and empyema. Miserable since then. Walked with decided limp.	Cod liver oil Salicylates Ertron (oral) Extraction of 5 teeth Synovectomy (right knee)	None Temp. relief
T105 **XXIX**	F	54	7 Yrs.	Rheumatoid	Hands, feet, knees, base of spine.	Slowly progressive becoming much more severe one year ago.	Physiotherapy Ertron (oral)	None
C273 **XXX**	F	54	11 Yrs.	Rheumatoid	Generalized pain in all joints, especially neck, face, wrists, fingers and knees.	Progressive except for short period after extraction of teeth. Pain first started in fingers. Fusiform swelling of hands and wrists. In 1942, removal of rectal abscess, fistula and appendix.	Vitamin B complex Tonsillectomy UVID Ertron (oral) Extraction of teeth	Slight None Improved Imp. (temp.)
W212 **XXXI**	F	54	3 Yrs.	Rheumatoid	Pain throughout body, especially right shoulder, right elbow, hands and feet.	Progressive with exacerbation and remission. When 23, fingers became numb and white in cold weather. 3 yrs. ago symptoms gradually spread to right elbow, shoulder and all other joints of body.	Private doctor Tonsillectomy UVID	Some None None

Clinical Chart—Ertron Parenteral Series—Continued

ERTRON PARENTERAL		TOXIC MANIFESTATIONS		CLINICAL OBSERVATIONS	REMARKS
Started Date	Weekly Dosage U.S.P. Units*	Local	Systemic		
11-18-42	1,000,000 to 1,500,000	None	None	Ceased to attend Clinic but patient is slightly improved.	
1-13-43	1,000,000 to 1,500,000	None	None	Unchanged.	
9-23-42	1,000,000 to 1,500,000	None	None	Improved on injections. Patient is now working in a department store.	Infected teeth present. Enlarged irregular retroflexed uterus, probably fibroid.
7- 8-42	1,000,000 to 1,500,000	None	None	Unchanged.	GU: smear shows definite evidence of focal infection.
1-27-43	1,000,000 to 1,500,000	None	None	General improvement. Weight increase from 112 to 120.	ENT: Removal of tonsils advised.
9-30-42	1,000,000 to 1,500,000	None	None	Definite improvement on injections of Ertron. Patient now working in a defense plant.	
5-13-42	1,000,000 to 1,500,000	None	None	Good results. No arthritic pain.	
5-20-42	1,000,000 to 1,500,000	None	None	Unchanged.	
9-16-42	1,000,000 to 1,500,000	None	None	Marked improvement. Much less swelling and pain in fingers and knees.	
8-11-42	1,000,000 to 1,500,000	None	None	Patient was improving but therapy was discontinued because patient refused to cooperate.	
5-20-42	1,000,000 to 1,500,000	None	None	Marked improvement. Patient is now working in a shipyard.	
5-13-42	1,000,000 to 1,500,000	None	None	Excellent results. No arthritic pain; complete range of motion.	
5-13-42	1,000,000 to 1,500,000	None	None	Marked improvement. No pain. Patient walks without difficulty.	
7-7-42	1,000,000 to 1,500,000	None	None	Good results. No arthritic pain. Marked reduction of swelling of all involved joints.	Teeth and tonsils are possible source of infection.
4-28-43	1,000,000 to 1,500,000	None	None	Definite improvement. Returned to former occupation as piano instructor.	
12-16-42	1,000,000 to 1,500,000	None	None	Continuous improvement while having injections of parenteral Ertron.	

*Ertron Parenteral—electrically activated ergosterol (Whittier Process) for intramuscular injection. Each cc. contains 500,000 U.S.P. units Whittier Process Vitamin D.

Throughout the course of this investigation, intramuscular injections of electrically activated ergosterol in doses up to 1,500,000 units were injected weekly without the occurrence of any sign of either local or systemic harmful effects. In a few cases a small lump could be felt where the oily solution had been injected, which disappeared after the part was massaged. Furthermore, neither the cellular nor chemical constituents of the blood showed any evidence of deleterious effects during the course of treatment.

Another series of cases has recently been started in which one injection of either 500,000 or 1,000,000 units of Ertron weekly is given in conjunction with either four or six capsules (200,000-300,000 units) of Ertron by mouth each day. This group of patients who are receiving the combined oral and parenteral Ertron have not been treated for a sufficiently long time to permit an accurate evaluation of the results at this time, but the preliminary observations suggest that this combined oral and parenteral method of administration will probably be the method of choice. These results will be reported in a future publication.

Conclusions

ERTRON, when administered *orally* in doses of from 200,000 to 300,000 units daily, has been found safe and effective for the treatment of arthritis.

2. Ertron, when injected *intramuscularly* in weekly doses of 1,000,000 to 1,500,000 units, has also proved effective in a majority of the cases treated.

3. No untoward local or systemic symptoms occurred in any of the patients receiving the intramuscular injections. Especially noteworthy was the freedom from all gastro-intestinal disturbances even with patients unable to tolerate Ertron by mouth.

4. In some cases of arthritis, the painful symptoms could not be entirely controlled by the weekly intramuscular injections alone. The combined use of the intramuscular injections with the daily oral administration of Ertron is now being studied. Preliminary observations seem very encouraging.

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Post-Graduate Course in Industrial Medicine
Long Island College of Medicine

Monday Afternoon, November 1

REGISTRATION, Polhemus Memorial Building. Address of Welcome—J. A. CURRAN, M.D., President and Dean.

Changing Concepts of Industrial Medicine:

A. Industry Looks to Medicine—

B. The Physician in Industry and His Field—W. IRVING CLARK, M.D., Medical Director, Norton Company.

Monday Evening, November 1

PLANNING an Industrial Medical Department:

A. The Organization and Administration of a Medical Department in Industry—MELVILLE MANSON, M.D., Medical Director, New York Telephone Company.

B. Special Problems of Small and Medium-Sized Plants—EDWARD C. HOLMBLAD, M.D., Managing Director, AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS.

Tuesday Afternoon, November 2

EVALUATING the Health Status of the Worker:

A. Newer Aspects of Pre-placement Examinations—GEORGE H. GEHRMANN, M.D., Medical Director, E. I. du Pont de Nemours.

B. Follow-up and Periodic Examinations—H. H. FELLOWS, M.D., Assistant Medical Director, Metropolitan Life Insurance Company.

Tuesday Evening, November 2

EVALUATING the Health Status of the Worker:

A. Employment of the Handicapped and Substandard Worker—CASSIUS H. WATSON, M.D., Medical Director, Am. T. & T. Co.

B. The Role of the Psychiatrist in Wartime and Post-war Industry—LYDIA G. GIBERSON, M.D., Industrial Psychiatrist, Metropolitan Life Insurance Company.

Wednesday Afternoon, November 3

THE SICK and Injured Worker and Industrial Compensation:

A. Occupational and Non-occupational Diseases—W. A. SAWYER, M.D., Medical Director, Eastman Kodak Company.

B. The Industrial Physician and Compensation Laws—HENRY D. SAYER, General Manager, Compensation Insurance Rating Board.

Wednesday Evening, November 3

COMMUNITY Factors in Worker Health:

A. Industrial Medicine and the Public Health Program—Speaker to be announced.

B. How Governmental and Other Agencies Can Help the Industrial Physician Meet the Problem—LEONARD GREENBURG, M.D., Executive Director, Division of Industrial Hygiene, New York State Department of Labor.

Thursday Afternoon, November 4

PROTECTING the Place of Work:

A. Appraisal and Control of Industrial Hazards—J. J. BLOOMFIELD, Senior Sanitary Engineer, Chief, States Relations Section, Division of Industrial Hygiene, Bethesda.

B. Plant Sanitation and Hygiene—ALLEN D. BRANDT, D. Sc., Safety and Security Branch, War Department.

Thursday Evening, November 4

PROTECTING the Place of Work: (cont.)

A. The Effects of Light, Temperature and Humidity—ANNA M. BAETJER, Sc.D., Associate in Physiological Hygiene, School of Hygiene and Public Health, Johns Hopkins.

B. The Effects of Abnormal Pressure and the Medical Aspects of Fatigue Prevention—GEORGE B. RAY, PH.D., Professor of Physiology and Pharmacology, Long Island College.

Friday Afternoon, November 5

INDUSTRIAL Toxicology:

A. A Survey of Hazardous Materials and Operations—W. P. YANT, M.D., Mine Safety Appliances Company.

B. Determining Margins of Safety in the Chemistry of Industry—JAMES H. STERNER, M.D., Director, Laboratory of Industrial Medicine, Eastman Kodak Company.

Friday Evening, November 5

INDUSTRIAL Toxicology: (cont.)

A. Dusts—The Pneumoconioses—L. E. HAMLIN, M.D., Medical Director, American Brake Shoe & Foundry Company.

Monday Afternoon, November 8

INDUSTRIAL Toxicology: (cont.)

A. Carbon Monoxide, Asphyxiation and Poisonous Gases—R. R. SAYERS, M.D., Director, U. S. Bureau of Mines.

Monday Evening, November 8

INDUSTRIAL Toxicology: (cont.)

A. Solvents and Volatile Organic Materials—NICHOLAS B. DREYER, M.D., Professor of Pharmacology, Long Island College.

Tuesday Afternoon, November 9

INDUSTRIAL Toxicology: (cont.)

A. Lead and the Heavy Metals—ROBERT A. KEHOE, M.D., Director, Kettering Laboratory of Applied Physiology, Cincinnati.

Tuesday Evening, November 9

INDUSTRIAL Toxicology: (cont.)

A. Industrial Dermatoses—LOUIS SCHWARTZ, M.D., Medical Director, Chief, Dermatoses Investigations Section, Division of Industrial Hygiene, Bethesda, Maryland.

Wednesday Afternoon, November 10

INDUSTRIAL Accidents:

A. The Management of Chemical and Thermal Burns and of Injuries to the Eye—J. M. CARLISLE, M.D., Medical Director, Merck & Co., Inc.

Wednesday Evening, November 10

INDUSTRIAL Accidents: (cont.)

A. Trauma and the Surgical Rehabilitation of the Injured Worker—JOHN J. MOORHEAD, M.D.

Thursday Afternoon, November 11

HEALTH Education in Industry:

A. Nutrition in Industry—ELMER ALPERT, M.D., Technical Adviser, Nutrition in Industry Division, Food Distribution Administration.

B. The Techniques of Health and Safety Education — L. HOLLAND WHITNEY, M.D., Medical Director, Sperry Gyroscope Company.

Thursday Evening, November 11

THE INDUSTRIAL Physician—Labor—Management:

A. Labor's Attitude Toward Industrial Health—LEO PRICE, M.D., Medical Director, Union Health Center.

B. Medical Requirements of Management for Industrial Efficiency—CLIFFORD E. PAIGE, President, Brooklyn Union Gas Company.

Friday Afternoon, November 12

SPECIAL Wartime Problems.

A. Civilian Defense and the Industrial Physician—J. J. BOURKE, M.D., Regional Medical Officer, U. S. Office of Civilian Defense.

B. Women in Industry—MARGARET SAWYER, Assistant to the Director of Personnel and Labor Relations, Todd Shipyards Corporation.

Friday Evening, November 12

COMPREHENSIVE Medical Care for Workers:

A. Programs to Insure the Health of Workers—FRANZ GOLDMANN, M.D., Associate Clinical Professor of Public Health, Yale.

B. The Results of Health Insurance Programs—J. J. WITTMER, M.D., Medical and Personnel Director, Consolidated Edison.

LATITUDE 0°

...yet no Sunshine

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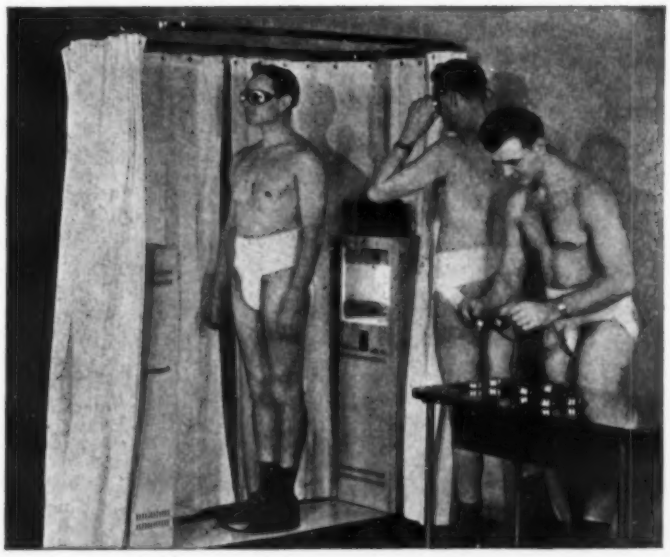

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Wake Up, Professor!

Glancing at the opening pages of the September issue of Industrial Medicine, one may well feel both proud and disappointed. Displayed there are the photographs of 17 men who, by research and application, promoted industrial health to its present high standard. Upon reading their biographies one is further impressed by the fact that these men are comparable to the leaders of any other branch of medicine and surpassed by none. Not pictured with them are others, of course, who have contributed equally to industrial medicine—Hamilton, Sayers, Selby, Sappington, Legge, Gardner, Drinker, McNally, and Mock, to name but a few. All of these we hail.

However, it is disappointing to contemplate that this group who care for the health of the largest segment of our population represent a phase of medicine not recognized by the medical school curriculum. How paradoxical! During the years that organized medicine and the medical schools ignored industrial medicine, industry found it to be indispensable. Today, in order to maintain production for the war effort, industry is crying for trained industrial physicians. After this global debacle the demand will be even greater. From whence is the supply to come? Those mentioned in the first paragraph learned the hard way—they grew up with American industry. But today the urgency for the industrial physician is immediate. Industry does not intend to furnish the entire education, but rather expects the physician to have a fundamental knowledge of the problems. That the demand cannot be met is an indictment against medical education.

It should be obvious that medical education needs to cut out some dead timber in its structure, or at least shorten some of its stays. Our colleges and universities constantly change their courses to conform to the requisites of the generation they serve. Logic, taught our grandparents, has been dispensed with in today's courses, nor is calculus imposed upon all who seek a degree. Individual abilities are recognized and the student is encouraged to satisfy his inclinations.

Not so with medical education. Each potential physician is required to take the same course and spend the identical hours on each course that his classmate does, regardless of individual aptitudes. He who intends to become a general practitioner or a pediatrician must struggle with the same subjects for the same length of time as one who aspires to scientific research. There is no opportunity to "major." Fully 75% of all those who spend many hours smoking drums or goosing frog muscle in physiology could learn all they need to know from a short didactic course. Other examples of too extended courses could be cited.

Medical education clings unjustifiably to the precepts recited by Osler a half century ago. No one will question the wisdom of Sir William's pedagogy as it was intended for his and the immediately succeeding generations. His dictum that all physicians should prepare for and spend a few years in general practice was logical then. Today we believe that great man would admit that such counsel is not applicable to all students. We believe he would be the first to order a housecleaning and a revision of the medical school curriculum. We only wish his successors were as progressive in thought.

It is not contended that all medical educators fail to appreciate the utility of industrial medicine instruction, but too many of them cannot see "how the curriculum can be expanded," or else they are planning such a course "sometime in the future," or "after the war." Why the dilly-dallying, professor? There is need for action now.

—Rutherford T. Johnstone, M.D.

Nutrition

On the basis of almost any standard for health and efficiency, the subject of nutrition is in a bad way. This is confirmed by the cumulative proof of repeated surveys, of which the following is a very excellent example. These are gradually measuring the problem and appraising its causes. The remedy most generally indicated is, of course, education. But that is a long process, although, to some extent, it is already being applied. Meanwhile, the industrial physician faces the dilemma that he can't wait; he must get results *now*—which probably helps to explain the increasing use of vitamins as supplementary on the basis that there is more likelihood that they will help than that they will hinder. At the present time there is much evidence that they do help—not nearly so much that they don't. . . .

The Illinois Department of Public Health* and the Illinois State Nutrition Committee are rendering assistance to industry in order that (1) wherever possible the workers be provided with adequate food, (2) an educational nutrition program be instituted (both inside and outside the plant) in order to acquaint the worker and his family with the requirements of an adequate diet.

During the past few months these agencies have been conducting nutrition surveys in several plants.

Results of surveys: Twenty-one plants, employing 72,949 workers were visited, of which nine plants (43%), employing 45,500 workers (62.3%) were chosen for a lunch survey. The cafeterias of these plants were patronized by only 4968 employees which represented only 10.9% of the total number of workers. Most of these were shop workers, very few were employed in the office.

*From "Industrial Nutrition Survey," in *What's New in Industrial Hygiene*, September.

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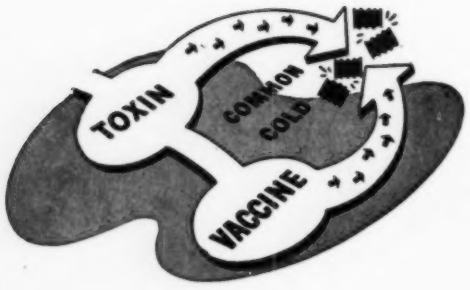

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*Pat. Pend.

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The most common choice of foods and the percent of workers so choosing were as follows:

Meat and other protein	72.1%	Vegetable	38.5%
Whole grain and enriched bread	60.5%	Dessert	35.6%
Potato	54.0%	Coffee, tea	33.1%
Butter	50.8%	Soup	24.0%
Milk	49.3%	Fruit	14.1%
		White bread	5.9%
		Carbonated drinks	3.7%

The above statistics do not include the vast amount of coffee, tea, or carbonated drinks used as a supplement to the noon meal by a majority of those who carry a lunch box.

Analyses of the trays of food revealed that only 14.8% of the lunches were adequate, 36.1% were fair, and 49% were inadequate. However, as was previously stated, only one check was made and, therefore, it can not be concluded that the results would always be similar. . . .

In most of the plants in which this survey was made, well prepared food from which an adequate lunch could be chosen at a reasonable price was available. Inadequate lunches were selected because the employees did not desire to choose the protective foods needed, planned to include them in other meals, or did not know what constitutes a balanced lunch. Food habits and racial customs also were influencing factors in these lunch selections.

The sales of milk were low in comparison with the sale of soft drinks, tea and coffee. This is due to the fact that milk is usually the same price or a few cents higher than the other beverages. Vegetable and fruit sales were also low as compared with the sales of candy, cake, pies, relishes, etc. This indicates that we need to extend and intensify our nutrition education programs.

It was observed that in a large majority of the plants, vegetables, fresh or canned, were overcooked. Many were overcooked when they reached the steam table and in some instances remained for as long as 70 minutes on the steam table before the last portion was served. Very few of the plants featured well balanced plate lunches at reasonable cost. Where available, this lunch was a popular selection. Very few plants had a nutrition educational program within the plant. Medical departments in several of the plants, however, were eager for assistance in such a program.

The Place of Dentistry

—In Industrial Health Programs—

LYMAN D. HEACOCK, D.D.S., M.P.H., F.I.C.D.,
Dental Surgeon (R), U. S. Public Health Service

DENTAL PROGRAMS in industrial plants are not of recent interest in this country. The first dental programs for industrial plant employees in the United States were established as early as 1915 and some of them have been in continuous operation since then.

In 1920, Dr. Thaddeus P. Hyatt, dental director of Metropolitan Life, presented what he considered to be the objectives of dentistry in industry:

It should be established for the purpose of educational work among the employees.

The work should be largely confined to preventive dentistry rather than reparative work.

Prophylactic treatments, examinations, and x-ray belong to the preventive and educational branches.

Employees should go to outside dentists for all operative work—fillings, restoration, et cetera.[1]

At this time, dentists, who were interested in improving the dental health of the industrial worker, held that such programs would motivate the employee to have the necessary dental corrections made. They also felt that an industrial medical department was incomplete without a dental clinic that would render a better service in aiding the worker to regain and maintain better health and thus increase production.

In 1923 it was reported that over 100 dental dispensaries employed the services of dentists in industry.

Presented at the Third Annual Meeting of the WESTERN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, Los Angeles, California.

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DUE TO PRIMARY DYSMENORRHEA

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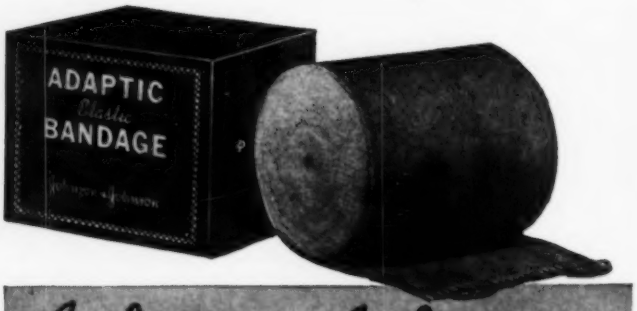

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Many of these dentists formed an organization that was called the National Association of Industrial Dental Surgeons.[2]

A few years later, in the early 1930's, during the period of the depression, we find a total lack of material in the literature on the subject of plant dental programs, but in the late 1930's and early 1940's, statements concerning the value of dental services in industry again appear in the journals.

In 1939 surveys to discover the prevalence and characteristics of dental services in industry were undertaken independently by two groups: the Committee on Economics of the American Dental Association and the Industrial Dentistry Committee of the First District Dental Society of New York City in cooperation with the Metropolitan Life Insurance Company. These two surveys showed that there were 144 companies having some type of dental program. It was also shown that provision for dentistry was made in only one of every 10 industrial medical programs in plants having 500 or more employees.[3]

An increasing amount of interest in industrial dental practice was developing and in October, 1941, the House of Delegates of the American Dental Association, recognizing this interest, passed a resolution which defined the minimum standards for dental service in industry and included an outline of the essentials of an industrial dental service.[4] Since the adoption of these standards and essentials by the American Dental Association we have become engaged in a war and it has been suggested that the present emergency calls for a broad interpretation of the provisions of this resolution.

In February, 1942, the U. S. Public Health Service assigned a dental officer to the staff of the Division of Industrial Hygiene, National Institute of Health, to aid in the development of industrial dental programs. Thus dentistry was included in the work of this Division, whose functions are the coordination of all industrial hygiene activities at the Federal and state levels, the promotion of industrial hygiene service in the state and local health departments, and laboratory and field investigations.

These activities are conducted cooperatively with state agencies, industry, labor, the medical and dental professions and other professions and organizations.[5]

Today there are 38 states with industrial hygiene services, employing nearly 300 professionally trained persons and spending approximately a million dollars yearly for this activity. Most of these 38 state agencies also have a dental unit and it will be through the cooperation of industry, state industrial hygiene and dental units, and state and local dental societies, that the proper development of industrial dentistry will be accomplished.

Industrial hygienists, whether physicians, engineers, nurses, or chemists are concerned with keeping the worker healthy and on the job.

The major needs in industrial hygiene have been stated by authorities as being medical and surgical care to effect prompt restoration of health and earning capacity following disability, the prevention of disability in industry by the proper control of the working environment, and finally the promotion of health among the workers. These objectives are almost wholly concerned with accidents and occupational diseases that are entitled to receive compensation.

The realization that non-occupational illnesses cause by far the greater percentage of absenteeism with the consequent production and economic loss, is resulting in greater attention being paid to these conditions of worker health.

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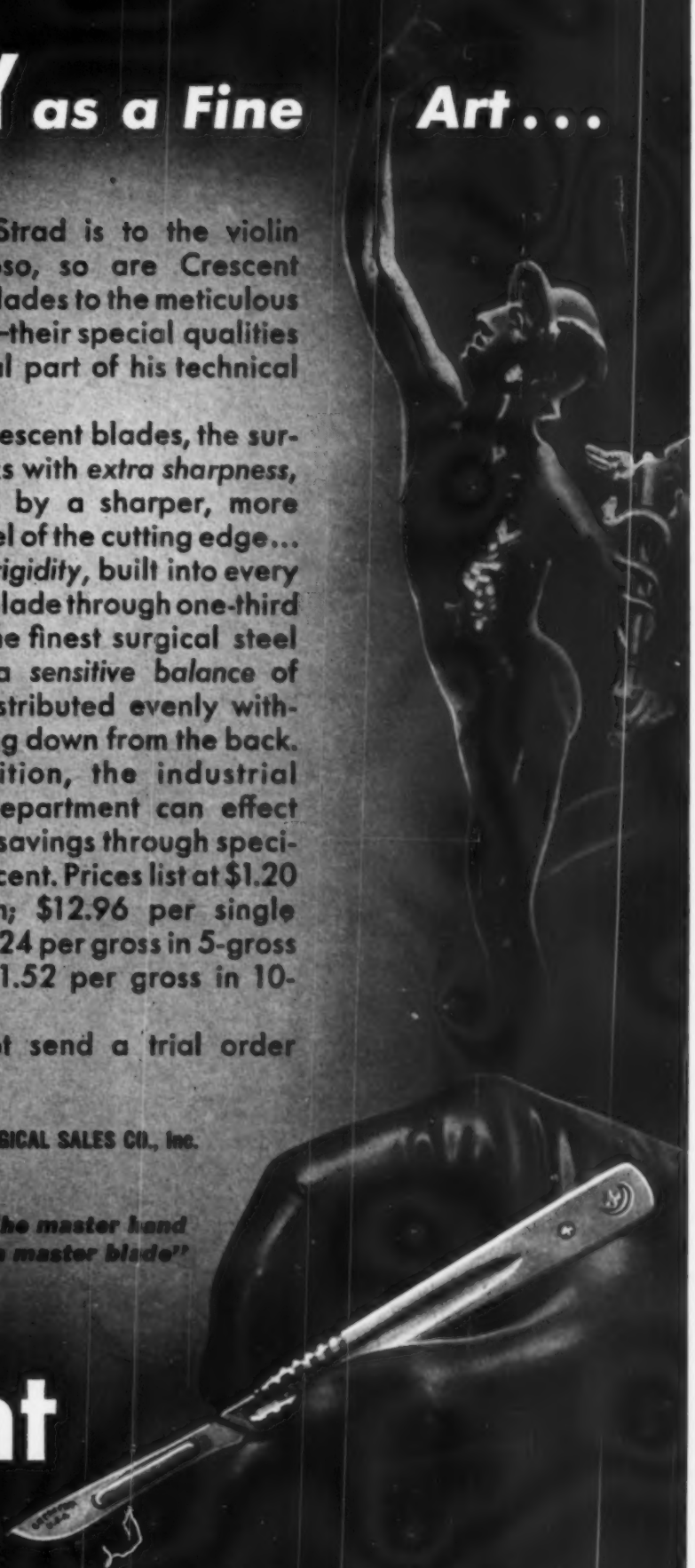

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low-up to see that remedial defects are corrected seem to be an approach to this problem. As a result of better follow-up it may be hoped that more industrial workers will receive adequate health services. Thus industry and the nation will be assured of a greater number of more efficient workers on the job.

The Council on Industrial Health of the American Medical Association has suggested a definite procedure for physicians who hold positions in industry with the respensibility of developing programs for industrial health maintenance.

This suggested program consists of such functions as periodic inspection and appraisal of plant sanitation and occupational exposures, followed by the adoption and maintenance of adequate control measures. Provision for first aid and emergency services and prompt and early treatment of all illnesses resulting from occupational exposure are included. Impartial health appraisal of all workers with advice on rehabilitation services for the correction of defects are additional functions of the medical department. And, finally, by recording and reducing absence due to all types of disability, it should be possible to make real progress in reducing lost time among workers, thereby not only benefiting the workers' physical well being, but also increasing production.[5]

In these recommendations for an over-all industrial hygiene program, I am sure that you can see the need for dentistry's inclusion, step by step.

Few industrial physicians realize the number of occupational hazards that affect the tissues and structures of the oral cavity. We are all familiar with the effect of lead, mercury, phosphorus and radium on the mouth, but there are many other chemical, physical, and bacteriological agents which will cause early signs of over exposure in the oral cavity. Schour and Sarnat, of the University of Illinois Dental College, say:

"Basically, every oral manifestation of occupational disease is a reaction following the exposure of the oral cavity or its component parts to external noxious agents which act either locally or systemically. The various pathologic end results may be classified in the following order: (a) abrasion, (b) decalcification, (c) caries, (d) pigmentation of enamel and gingivae, (e) inflammation, (f) circulatory disturbances, (g) degeneration and (h) neoplasm."[6]

Thus the type of industry often dictates the need for certain types of dental service. The raw materials used and the industrial processing will necessitate the placing of emphasis on specialized diagnostic service and certain dental operations. For this reason prophylaxis and the filling of carious teeth are essential operations for the prevention of serious sequelae in some industries.

Although many of the known hazards have been greatly reduced, the present gearing of industry to an all-out war effort and the use of many new raw materials and chemicals have produced new hazards as well as increased the danger of exposure to the better known ones. The industrial dentist should be qualified to recognize and record as well as treat mouth lesions resulting from over-exposure to industrial hazards.[7]

Many of the non-occupational diseases and some of the more serious nutritional deficiencies may also be recognized by their distinctive oral manifestations.

Today absenteeism in industry is a problem which looms large in the minds of all who think in terms of war production. Ill health and accidents are credited with causing an unbelievable amount of time lost from work. The statistical breakdown of this time loss into causes does not give a great deal of information on the amount attributable to adverse oral conditions.

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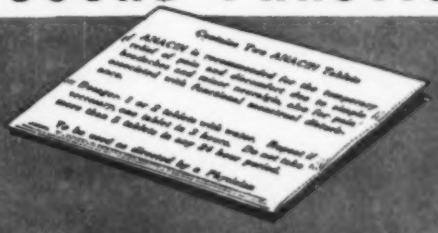

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*Swartz & Reilly, "Diagnosis and Treatment of Skin Diseases," p. 66.

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One reason for this is that many absenteeism figures are based on reports for compensable disabilities that exceed seven days in duration.

In December of last year the medical consultant of an industry that employed over half a million workers informed me that the absenteeism figures on diseases of the teeth and gums in the male group in that industry showed a frequency rate of 0.8 persons per 1,000 employees and an average duration of 27 days. Bear in mind that only those dental cases were included that were of seven days duration or longer. Most dental disorders cause absence of much less than seven days per case. The figure of 27 days average duration shows that it must have been weighted by some very serious cases.

This physician went on to say that the figures were far from complete, chiefly for the reason that the majority of disabilities from pathological conditions of the teeth and gums are of short duration. He admitted that there was a distinct possibility that some of the complications attributable to bad teeth were not included. He also said that in comparing this frequency rate of 0.8 per 1,000 male workers with other rates in this industry, the rate for dental disability was almost on a parity with that for tuberculosis, and this being the case, it seemed odd that we should spend thousands of dollars for the prevention of tuberculosis and pennies for dental prophylaxis.

Many dental programs were instituted and have continued to operate on the basis of moving the private practice of dentistry into the industrial plant dental office. Industrial dentistry should be *more* and *less* than this. It is *more* in the sense that the industrial dentist must coordinate his work and integrate his knowledge with the functions of the whole industrial hygiene program and *less* in that his work is limited to procedures that will keep the worker healthy and on the job with a minimum amount of work time lost because of dental ills.

Advice and assistance in planning plant dental programs can be secured by consulting with (1) the state health department through its dental and industrial hygiene divisions, (2) the state and local dental societies through their committees on industrial dentistry, (3) the American Dental Association through its Council on Dental Health, and (4) the U. S. Public Health Service through the Division of Industrial Hygiene, National Institute of Health.

There are certain essential features that should be common to all industrial dental programs. They may be enumerated as a foundation upon which programs expressing local needs and limitations may be erected.

1. Personnel.
2. Office space, equipment, and supplies.
3. Records and recording.
4. Examination service.
5. Emergency service.
6. Prophylactic cleansing service.
7. Dental health education.

The employment of a full-time dentist is advisable for those plants which are able to support one. He should operate in a well equipped office in or near the plant and should maintain an adequate record system.

The pre-placement examination and possibly the periodic examination should be made concurrently with the medical examination of all employees.

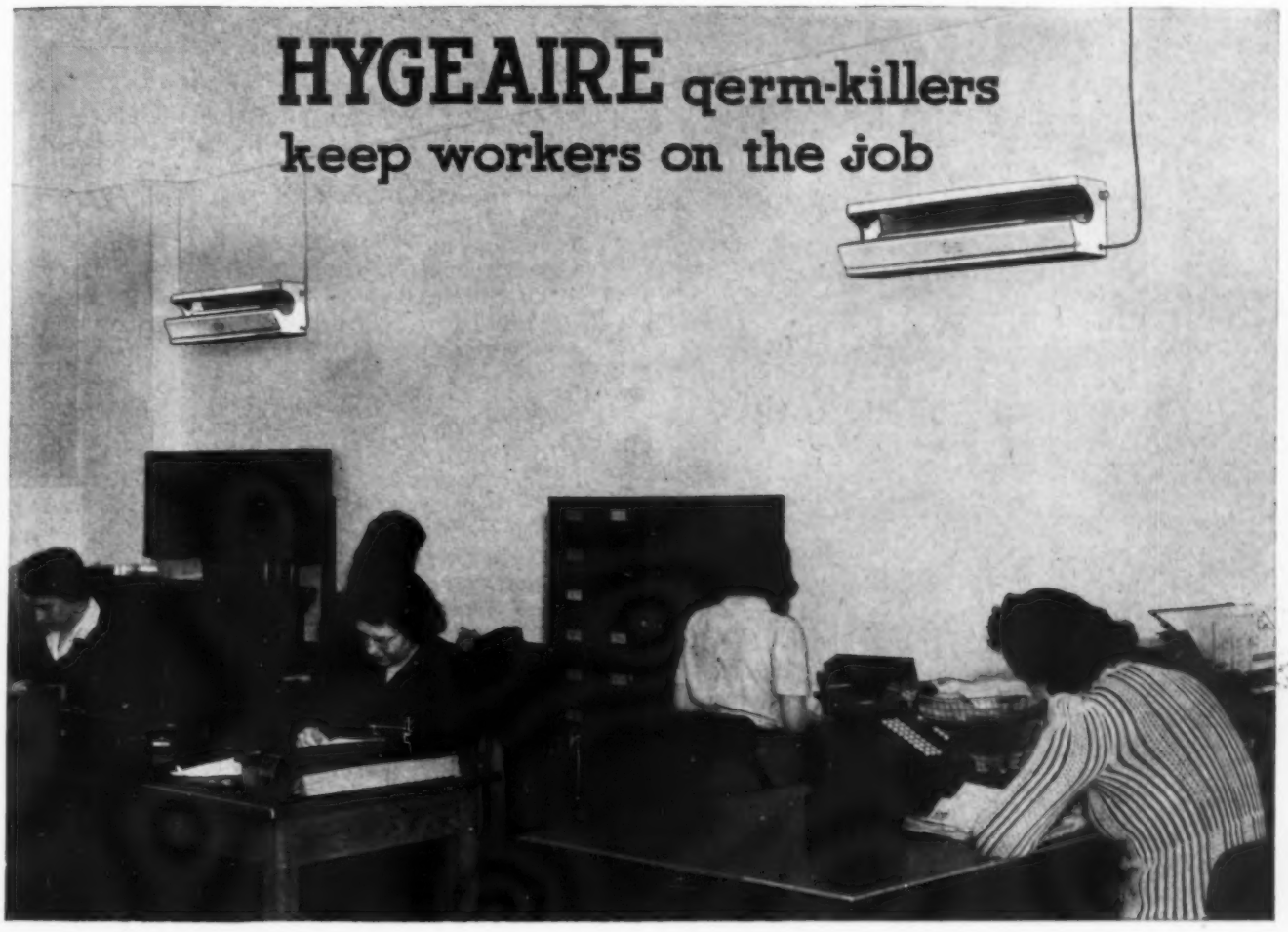
The following types of service may be considered emergencies:

1. Treatment for accidental injuries, toothaches, and acute and chronic infections.

2. Prophylaxis and the filling of carious teeth for employees exposed to certain occupational hazards.

3. Extraction of teeth to eradicate infection.

HYGEAIRE germ-killers keep workers on the job



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Supply your workers with Du Pont "Pro-Tek," recommended by many industrial physicians and safety engineers. This hand-protective cream shields the skin from paint, grime, insoluble cutting oils, and non-aqueous solvents (but should not be used against compounds which enter the circulation through the skin). "Pro-Tek" is applied to hands and arms before starting work, then washed off with water when the job is done. "Pro-Tek" costs little, but may save many thousands of priceless man-hours in this all-important war year. Send today for Free Sample. *Write the Du Pont Company, Dept. M-1, Wilmington, Delaware.*

THE ORIGINAL INVISIBLE GLOVE

Every opportunity should be made to inform the employees of the necessity for early and complete dental care.

Small plant employees as well as those in large plants need dental services and the problem is the choice of a method that will make these services available. Several methods follow, the choice may be one or a combination of these methods.

1. Several plants collectively employing the full-time services of a dentist operating part-time in an office in each of the plants, or in a central clinic to which all employees are referred.

2. A plant employing a definite portion of a dentist's time for service, either in the plant office or his private office.

3. A plant supplying office space and equipment for use by a dentist who conducts a private practice made up of the plant's employees.

4. A group of private dentists arranging with a plant or group of plants to supply diagnostic service, the employee being referred for service to his own dentist or to his choice from this panel of dentists.

5. A number of small plants scattered over a wide area employing the services of a dentist who operates in a mobile dental office or with portable equipment, thus taking dental service to the workers at the various plants.

No attempt will be made to discuss programs for dental care instituted through the efforts of employee groups, company or employee credit unions, mutual benefit associations or by local dentists who arrange with these or other agencies, to supply service on some prearranged financial basis. Such programs for dental care usually follow one of the methods previously mentioned.[7]

It is difficult for employees in many expanded war industrial areas to secure appointments for emergency work at local dental offices. Southern California dentists, locally and through their Southern California State Dental Association have been actively working on this problem for the past eight months. In one town the local dentists have arranged to have one office available at all times for those seeking emergency treatment. In another locality, a central clinic is operated by a group of dentists, each one of whom spends a portion of his time supplying emergency service.

The Southern California State Dental Association has set up a bureau in its central office for the purpose of aiding dentists to relocate in expanded war industrial areas.

Efforts such as these reflect the attitude of the dentists of the country. Individually and through their official organizations—national, state, and local—they are keenly interested in aiding in the development of the best type of dental service in industry. Their interest is reflected in their active cooperation with industry and government in endeavoring to secure for the worker good oral hygiene and freedom from pain and infection.

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AN OLD PERSONAL PROBLEM NOW IS A MODERN PERSONNEL PROBLEM

Wars usually are accompanied by an increase in *Pediculosis,* a condition produced by head lice and crab lice. This condition also may become prevalent among war production workers in crowded factories and communities.

The problem of Pediculosis is of direct concern to management, as well as the individual, for a single case may lead to infestation of other employees. This is especially true because employees cannot always be depended upon to take prompt, efficient action to combat the condition. And a person who accidentally becomes infested may not know what to do and, because of embarrassment, may hesitate to seek advice.

CUPREX—The 15-Minute Treatment—offers several important advantages in the treatment of Pediculosis. *It is as easy to apply as a hair tonic, and one application usually is sufficient to destroy both the lice and nits.* There is no need for messy and repeated treatments. Hence, there is no embarrassment, and no time lost from work.

Within 15 minutes after Cuprex is applied, it may be washed from the hair, leaving no telltale odor or appearance.

In an effort to aid the physician, nurse, or others whose duty it is to prevent the spread of any condition that may interfere with normal plant routine, we have prepared a series of educational posters and folders for distribution to employees. A quantity of this literature, and an adequate trial supply of Cuprex, The Personal Insecticide, will be sent to you upon request. The coupon is for your convenience.

IM—10-43

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☐ A supply of Cuprex for trial use

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FOR supplying Mercurochrome and other drugs, diagnostic solutions and testing equipment required by the Armed Forces, for developing and producing Sterile Shaker Packages of Crystalline Sulfanilamide especially designed to meet military needs, and for completing deliveries ahead of contract schedule—these are the reasons for the Army-Navy "E" Award to our organization.

The effectiveness of Mercurochrome has been demonstrated by more than twenty years of extensive clinical use.

For the convenience of physicians Mercurochrome is supplied in four forms—Aqueous Solution for the treatment of wounds, Surgical Solution for preoperative skin disinfection, Tablets and Powder from which solutions of any desired concentration may readily be prepared.

Mercurochrome (H. W. & D. Brand of dibrom-oxymercurifluorescein-sodium) is economical because stock solutions may be dispensed quickly and at low cost by the physician or in the dispensary. Stock solutions keep indefinitely. Literature furnished to physicians on request.

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BALTIMORE, MARYLAND

Industrial Dentistry

Los Angeles County Dental Society
—Questionnaire—

YOU ARE aware of the trend toward Industrial Health Service—

(a) Have you contacted or felt the influence of this trend in your practice and, if so, in what way?

No 103 (Signed 74—Unsigned 29)
Yes 45 (Signed 28—Unsigned 17)

(b) Would you, personally, be interested in connecting yourself with an office, clinic or hospital attempting to administer "Dental Service?"

No 103 (Signed 70—Unsigned33)
Yes 46 (Signed 33—Unsigned 13)

(c) Do you think "Industrial Dentistry" should be any different, in the end result, than the highest ideals of private practice?

No 110 (Signed 74—Unsigned 36)
Yes 32 (Signed 26—Unsigned 6)

(d) What, if any, factors do you think would control this type of practice?

Politics 95 (Signed 75—Unsigned 20)
Remuneration 85 (Signed 70—Unsigned 15)

(e) What are your ideas concerning a standard for dental practice or, in other words, what is the purpose of "Industrial Dentistry?"

To lower cost to patient 63 (Signed 46—Unsigned 17)
To improve dental health 47 (Signed 34—Unsigned 13)
Quality of work will suffer 68 (Signed 49—Unsigned 19)

(f) How can we arrive at a standard of dental practice?

Can't be done 41 (Signed 27—Unsigned 14)
Education of dentist 27 (Signed 21—Unsigned 6)
Supervision 17 (Signed 10—Unsigned 7)
Education of public 13 (Signed 7—Unsigned 6)

(g) It is surely an accepted idea that any dental service should and must be a credit to the dental profession which, obversely speaking, means a health benefit to the patient. How could "Industrial Dentistry" be supervised to insure this situation?

Supervision by dental society 69 (Signed 47 Unsigned 22)
Personal integrity of dentist 50 (Signed 34—Unsigned 16)

(h) Education in the United States is firmly established as a sociological problem and a duty of the government, local, state and federal. Education is accepted as a social responsibility practically the world over. Will you discuss the similarity or dissimilarity of Education and Health Service as a duty and responsibility of the government?

Similarity acknowledged 95 (Signed 70—Unsigned 25)
Similarity denied 36 (Signed 21—Unsigned 15)

IT IS A well-known and accepted fact that dentists must make a living. It has been stated that, at the present time, there are three ways of paying for dental service: (1) The patient pays the proper fee for the services performed. (2) The patient pays part of the fee and the dentist pays the balance as a charitable contribution. (3) The dentist makes his living by slighting the integrity of the service rendered.

(a) Do you think it is justifiable for a dentist, physician or surgeon to charge the "rich" patient enough to compensate for those able to pay only a part or none of the proper fee? Will you discuss your reasons pro or con?

Justifiable 90 (Signed 60—Unsigned 30)
Average reason: They are able to pay.
Unjustifiable 66 (Signed 46—Unsigned 17)
Average reason: Why should they pay for the dentist's charity?

(b) Corporation officers and heads of departments work on salaries. It is generally believed that the honesty of their services and intentions are not jeopardized by the fact that they are paid a salary or wages. Do you know of any good reasons why a dentist or physician would be less honest on a salary than the present fee system, which has been called a "catch as catch can" method of making a living?

He would be as honest 87 (Signed 64—Unsigned 25)

Questionnaire by the Los Angeles County Dental Society, 1942, included in "What Is Necessary to Make Industrial Dentistry a Credit to the Dental Profession?" by F. F. PETTY, D.D.S., in *J. Am. Dental Assoc.*, September 1, 1943.

MUSCLE PAIN INTERFERES WITH PRODUCTION

Clinical observations indicate that a Johnson's Red Cross Plaster is beneficial in the treatment of muscular aches, stiffness, wrenches and strains. The effects of this approved medicated plaster are attributed to warmth, anodyne effect, physical support and passive massage. Try one on your next case.

Send for trial supply of Johnson's Red Cross Plasters.
Check results after employees have used them.

JOHNSON'S RED CROSS PLASTER

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Send me trial supply of Johnson's Red Cross Plasters.

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"the most devastating of all sickness"

. . . for safe, soothing symptomatic relief
. . . and to help prevent complications

PINEOLEUM* PLAIN—widely recommended for the stimulating and mildly antiseptic value of its camphor (.50%), menthol (.50%), and oils of eucalyptus (.56%), pine needles (1.00%), and cassia (.07%)—incorporated in a protective base of bland, highly refined liquid petrolatum—for use as spray or drops.

PINEOLEUM* WITH EPHEDRINE—contains (in addition to the standard formula) .50% ephedrine, thus furnishing a safe degree of vasoconstrictive action where desired—in same form as above.

PINEOLEUM* EPHEDRINE JELLY—in handy nasal applicator tubes, for greater convenience plus ease of application.

* Reg. U.S. Pat. Off.

THE PINEOLEUM CO., NEW YORK 4, N. Y.

He would not be as honest 55 (Signed 44—Unsigned 11)
It would depend
on his remuneration 52 (Signed 35—Unsigned 17)

(c) What are your reasons for favoring or not favoring an "Insurance Plan" or "Government Taxation" for the payment of Health Service fees?

Insurance plan
Against 73 (Signed 52—Unsigned 21)
For 50 (Signed 35—Unsigned 15)
Government taxation
Against 65 (Signed 45—Unsigned 20)
For 40 (Signed 25—Unsigned 15)
Reason against
Fear politics 67 (Signed 55—Unsigned 12)
Reason for
Better dental health 38 (Signed 20—Unsigned 18)

(d) Do you believe the matter of a "free choice" on the part of the patient regarding his doctor is an essential or non-essential factor in the establishment of "Industrial Dentistry?"

Essential 88 (Signed 62—Unsigned 26)
Non-essential 44 (Signed 29—Unsigned 15)

(e) What is your reaction toward Socialized Health Service, particularly as it affects dentistry?

Against 80 (Signed 54—Unsigned 26)
Approve 56 (Signed 41—Unsigned 15)
Undecided 19 (Signed 54—Unsigned 6)

(f) Do you, or do you not, believe that we could have "Industrial Dentistry," as defined, and still retain the elements of private practice? Discuss your reasons pro or con!

Yes 92 (Signed 65—Unsigned 27)
No 63 (Signed 43—Unsigned 20)

—*Continued from page 4.*

repetition. . . . SOME book reviewers seem to be going overboard on the subject of Henry Kaiser's invention of industrial medicine and Paul de Kruif's discovery of it. DR. CUTTER'S review of de Kruif's book (page 702), however, is a masterpiece of proper appraisal. . . . THERE is a comment on page 14 about the "proliferating wordiness" of articles in medical journals. We don't agree—not at all. Aside from the suggestion that the writer might take his own medicine (in that "proliferating" in the above-quoted phrase may be considered unnecessary), the only criticism we would make, after long experience with the manner in which doctors write, is that they could very effectively use more pronouns. Examples: "he" or 'she" for "the patient," and "it" with reference to the "case"—the former more often than the latter. We have found that the doctors who write are not padders; they are interested in exactness, and some can be exact in fewer words than others. We prefer to let the abstracters and condensers concern themselves with the possibilities of verbal proliferation; not even the present shortage of paper makes it necessary to standardize expression. . . .

"GOOD-NIGHT, NURSE! I THINK I'LL SLEEP TONIGHT"

You *bet* they'll sleep better, if she gives surface skin irritations a going over with Poslam. Depend upon this CONCENTRATED ointment to lessen discomfort from chafing, sheet burns, pressure sores, eczemic itching, acid perspiration, rectal irritations. The first application usually insures quick, prolonged relief and much-needed rest. Samples on request. Write postcard to Emergency Laboratories, Dept. **10-X,** 254 W. 54th St., New York 19, N. Y.

All U.S.P. ingredients: phenol ⅓ of 1% with oil of cade, sulphur, salicylic acid, menthol and zinc oxide in ointment base.

POSLAM

THE FOREMOST OPPORTUNITY FOR PREVENTIVE MEDICINE

. . . IT LIES with the industrial physician, moral custodian of the nation's health assets . . . Two years of war have already taken toll of workers' health as well as production quotas; and threaten a postwar rise in the death rate, unemployables and invalidism.

You who are in close, constant contact with the personnel of industrial plants know that physical deterioration stems not so much from longer hours, poorer housing, lack of familiar comforts and conveniences—but principally from diet deficiencies resulting from ignorance of nutrition values, haste, and incorrigibly bad eating habits.

WITH ALL the steadily accumulating evidence, there is no longer any question of the need of vitamins as a diet supplement. And to physicians experienced in the pharmacology of vitamins, the superior functional efficiency of Super Seal *Vitalert* is obvious.

High in potency, the single pellet of Vitalert contains far in excess of minimum daily requirements in vitamins. And the Super Seal construction releases the water soluble vitamins in the stomach . . . protects fat soluble A and D from the gastric juices by an inner, acid-proof coating, delivers them *full strength* to the intestines—the only media where fat soluble vitamins can be properly absorbed and disseminated. Super Seal construction prevents the loss of any vitamin values to the system.

TESTS by outstanding physicians in industrial medicine have resulted in the adoption of Vitalert by scores of large corporations. The resultant improvements in worker health, morale and output have invariably justified their selection . . .

Vitalert Formula: Vitamin A—5,000 USP units; Vitamin B_1—1,000 USP units; Vitamin B_2—3 milligrams; Vitamin C—1,500 USP units; Vitamin D—1,000 USP units; Niacinamide—20 milligrams; Calcium Pantothenate, 1 milligram. *Clinical literature and samples on request.*

Vitallergy clinically tested Super Seal Vitamin C in high concentrate, with A and B_1 . . . effective in relieving symptoms of industrial allergies, chemical dermatitis, etc. Clinical samples. Correspondence invited.

VITALERT

WE WEIGH THE FACTS

Developed by J. E. TRAUTMAN & ASSOCIATES • *Research Analysts*

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INDUSTRIAL HEALTH and DISEASE

Industrial Medicine

EMMET DWYER, B.A., M.D.,
Regional Medical Officer,
Western Region,
Canadian National Railways and
Trans-Canada Air Lines

GOOD medicine is not necessarily good industrial medicine. To be a competent industrial physician it is necessary to be more than just a doctor. A physician who serves industry must know something of the principles of management and labor relations. He should be familiar with the industrial processes carried out in the plants he serves, and, whilst he always required at least some casual knowledge of industrial hygiene in connection with lead, silica, and carbon monoxide, the war has resulted in our plants undertaking manufacturing processes entirely new to them and involving the use of toxic chemicals with which the industrial physician must become familiar. He must also deal with first aid, accident prevention, and sanitation, and be prepared to treat and advise sick and injured employees whether male or female. He conducts routine examinations for various specific purposes and so is called on for advice in placement and rehabilitation problems. He meets frequently with lawyers, claim agents, and compensation boards, and is expected to assume numerous and diverse duties ranging from the organization of the Red Cross blood donor campaign amongst his firm's employees to advice on the best and safest solution for cleaning printing machines.

In *Manitoba Medical Review*, April, 1943.

HYGIENIC DEFENSE

ALKALOL

Used daily as a nasal douche is worth recommending to industrial workers.

★

Keeping the vital nasal passages clean is hygienic defense, against colds and infections.

★

THE ALKALOL COMPANY
TAUNTON MASS.

I am not, of course, suggesting that we in industry are specialists in everything. I have, in my department, a number of nurses, clerks, and technicians, and trained advisers on first aid sanitation, and accident prevention, and, in organizations like the Canadian National Railways and Trans-Canada Airlines, advice is available from specialists in practically all types of industrial and professional work.

In spite of so much valuable assistance, however, the doctor in industry must still know and treat his patients and spend a good many of his evening hours studying subjects that many of you do not have to bother with.

Skin Protection

RECENTLY I have had to recommend skin protection ointments for workers who use cleaning agents like "gunk" and "varsol" but who handle highly polished materials that must be smeared with grease. This problem was met in two ways. First of all I provided a preparation known to the chemical trade as "the invisible glove"[1] type of ointment, which when rubbed into the skin deposits vanishing cream in the pores and leaves an adherent protective coat of powder on the surface. Application of this paste leaves the skin with a dry "tacky" feeling almost as if it were covered by a snugly-fitting glove so that I also advised the use of what the ladies buy under the name of "skin food," that is a lanolin and castor oil mixture to rub into the skin after the end of the work shift.

Radium Hazard

ANOTHER interesting problem I am working on at the present time is the question of the radium hazard amongst workers repairing luminous instrument dials. We have an instrument repair room in which 65 persons work. At times several thousand luminous dials are stored in and above the room. After study of the situation I issued detailed instructions on the storage and handling of these dials, insisted that repair men, and women, wear rubber gloves and use forceps when working on them, banned food from the workshop, arranged for improved washroom facilities, and had the ventilation system altered. After carefully studying the situation and consulting with experts,[2] I decided that there was no real danger to these workers from gamma radiation but for the protection of all concerned I am having a Geiger-Muller counter built and with it I will, from time to time, test all exposed employees to determine how much, if any, radon gas they are exhaling.

Goggles

IN OUR organizations we are actively interested in saving eyes. We found that many hundreds of our employees have only one useful eye. All of these men and all who are engaged in work that might damage their sight are required to wear appropriate safety goggles. No doubt you have often heard it said that a one-eyed worker seems never to injure seriously his remaining eye. However, during the past winter I have handled at least three cases that cast doubt on such a belief. All concerned were middle-aged men who had lost the sight of an eye by accident in our employ before the days of safety goggles. The first one still had his useless eye but had to have it enucleated after it was struck by a flying nail. The second man had had a traumatic cataract in one eye from childhood. After he lost his good eye a lens removal from the other one plus the use of corrective spectacles enabled him to obtain 20/40ths vision in it and in spite of the passage of time it does not appear that this vision has lessened very much but the man himself has gradually developed a psychosis and is firmly convinced that he can no longer see well enough to do his work. The last of this trio noticed one evening in November, 1942, that he could not read his evening paper. Over a period of a week the sight in his remaining eye deteriorated to 4/100ths. The doctor he consulted initially told him he had welder's retinitis. As you probably know, a man who has two good eyes, and loses one by accident costs the employer, hereabouts, on the average, about $1,600.00. The same average man who has only one good eye and loses it by accident costs his employer about $10,000.00. I felt very sorry for the claimant in this particular case but I knew that he did very little welding and that when he did any he always protected himself with the proper shade of welding glass and that he could not, therefore, have welder's retinitis. I arranged for an examination by another eye specialist, who diagnosed "retinal thrombosis." The man's claim was rejected but the company is at present considering granting him a gratuitous pension.

In conducting a medical service for an industry, whether it be a wealthy established firm or a struggling new business, the doctor must demonstrate that the service pays. It should pay in

PRURITUS ANI RELIEVED

Quickly . . . Conveniently

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GADOLETS

IN his study, Dr. R. H. Aldrich reports on the efficacy of Gadolets in the treatment of pruritus ani—that distressing condition which is responsible for decreased efficiency and many lost hours.

An important phase of the investigation was the short time required to bring about relief both subjectively and objectively. Patients appreciated the ease of application of Gadolets as compared with suppositories. No untoward reaction to Gadolet therapy was noted.

GADOLETS (PATCH)

—small gelatin applicators containing the *Original American* Cod Liver Oil Ointment—Gadoment. Exceptionally convenient to use—simply slit the end and apply direct to the affected area. The soothing, healing effect of the cod liver oil ointment is quickly apparent.

Indications for Gadolets

Pruritus Ani
Internal and External Hemorrhoids
Cryptitis
Pruritus Vulvae
Senile Vaginitis
Fissure-in-ano
Fistula-in-ano

Gadolets are supplied in packages of 15 and 30.

GADOMENT

Gadolets contain Gadoment—the bland, cod liver oil ointment which has proved its important therapeutic value in burns, abrasions, crushing and destructive injuries, varicose and decubitus ulcers, eczema.

Sterile and bactericidal
Stimulating to granulation and epithelization
Accelerates liquefaction of dead tissue

Send for copy of treatise **"COD LIVER OIL THERAPY"**

THE E. L. PATCH COMPANY
BOSTON, MASS.

dollars and cents; in employer-employee relationships; in increased efficiency of the workers; and in a lower accident rate and shorter disability periods.

The industrial medical department should not, as a rule, attempt to furnish a complete medical service. We offer full care of industrial accidents and illness, and, in addition, treatment of ambulatory illness only, primarily to try to keep the worker on the job. We do not follow the sick employee into his home, but, instead, refer him to his family physician with whom we are always ready and anxious to cooperate whether by communicating our findings and opinions to him, or, by trying to get special consideration at work for his patient when such is indicated.

Confidential Files

A MEDICAL control program in an industry must fit in with the company's administration and must also satisfy the employees, or, in other words, make the unquestionably difficult attempt to "Serve both God and Mammon." To do this you must "call the balls and strikes" as you see them, keep out of disputes, and recognize conditions as they are and not as they might be. Case histories must be accurate and held in strictest confidence even from senior officials of the company to whom necessary reports should, as a rule, be made only in the terms "fit" or "not fit," though, of course, circumstances will modify this rule at times, particularly where the welfare of other employees or an unjust claim for injury may be involved.

Routine Examination

IN MY office we carry out routine examinations hour after hour and day after day. All applicants for employment must be examined. The entrance to service standards vary with the job in prospect. Men out of service for six months, or sometimes less, are examined before they return to work. Food handlers are examined every three months. Applicants for extention in service past the normal retiring age or for early retiral on pension on account of ill-health must be reported on. All men in train, yard or engine service and a number of smaller groups receive an eye, ear and physical examination every two years. Airline pilots have a particularly painstaking examination[3] with many special tests every three months. Stewardesses and airplane despatchers are similarly handled and in Trans-Canada Airways everyone in the employ is examined at least every two years.

To some extent these routine examinations become tiresome. There are about 120 District Medical Officers in the territory under my jurisdiction and all their examination reports come to me. During these war years labour turnover in some branches of our work has run as high as 40% per month. Consequently, I see thousands of examination reports in a year but if you would look at this monthly summary of rejections for January, 1943, you might feel that even routine physical examinations can provide a doctor with a large number of most interesting cases. This list of 75 names includes rejections on account of deafness, blindness, defective color-sense, various deformities both congenital and acquired, "writers cramp," gastro-intestinal and gall-bladder conditions, ischio-rectal abscess, osteomyelitis of the pubic bone, syncopal attacks from various causes, and of course, heart disease, diabetes, nephritis, and a number of other conditions either alone or in combination.

I really think, however, that as compensation for the drabness of routine examinations, the industrial physician sees a greater number and variety of interesting conditions than does the average doctor in private practice. Many of the problem cases in our five Western Provinces and in the State of Minnesota eventually arrive at my office for investigation, advice or decision as to suitable work. Oftentimes these cases have been carefully studied by various medical specialists, supervisory officers, claim agents, lawyers, and compensation boards, and the results of all these investigations are available to me. I see the mistakes that have been made by the medical attendants and the most common error is the use of "*post hoc ergo propter hoc*" reasoning, or, in other words, the assumption by the doctor that because a disability followed an alleged accident, perhaps a most trivial one, the ensuing serious disability should be attributed to that accident.

Costly Cases

ONE outstanding example of this was the case of Trainman "B," aged 52. He sustained a minor contusion of the chest. No rib fracture was ever demonstrated. I examined him a week after his accident and said he could return to work. However, he developed an acute illness with high fever and was off work another six weeks. His family doctor attended him and never did make a diagnosis but did state that the disability was the result of the accident though it seemed altogether likely that the man had an encephalitis. A few months after he resumed duty he was suspended for unsatisfactory work. On examination it was evident that he had paralysis agitans. He was continuously disabled until his death from broncho-pneumonia some three years afterwards. He had never had even so much as a head injury to vaguely explain his disability and yet the compensation board assessed costs of some $10,000.00 against the company. I assembled three different medical boards of particularly qualified men who submitted very able reports ruling out the trauma as a cause of disability but all to no avail. The opinion of the man's own doctor outweighed the rather overwhelming evidence I had produced.

Coronary artery disease brings forth many comparable cases. The average age of railway employees is around the mid-fifties. I see or have dealings with a number of coronary cases every month. A claim for compensation is filed in over half of the cases that occur at work. As a rule we effectively disclaim responsibility but in the Province of Saskatchewan many of our employees have chosen to deal directly with the company in case of injury rather than through the compensation board and since the courts in that Province put a very broad meaning on the word "accident," we have, to my knowledge, paid perhaps a dozen such claims in Saskatchewan where the attending doctor gave a written opinion that the coronary attack was the result of an accident or of some commonplace effort incurred in the course of routine duties.

A train baggageman, "R," aged 54, was helping two other men lift a trunk into a baggage car. He collapsed and 12 hours later he died. He had had a blood pressure of 240/140 with other cardio-renal signs for about two years. The doctor who attended him attributed death to the "strain" of lifting the trunk rather than to the long overdue result of his vascular disease.

I personally subscribe to Paterson's[5] theory of coronary occlusion. You will recall that he has demonstrated that a coronary occlusion commences with the rupture of a subintimal capillary into an arteriosclerotic plaque in a coronary vessel, and that a number of days elapse between the beginning of this process and the onset of acute symptoms. Consequently, it is not reasonable to attribute the attack to some shortly antecedent effort.

As a matter of fact in this case of Baggageman "R," the labour organization's lawyer, after spending some hours with me with our lawyer and an independent cardiologist, reduced his claim from $10,000.00 to $1,500.00. Rather than go to court we paid this sum though, for a long time, I have been waiting for a suitable case of this type to bring into court with the hope that a new legal precedent might be established.

If it should prove possible to convince courts of law that industry should not be held responsible for attacks of coronary thrombosis and other disabling cardiovascular disease occurring amongst workmen in the course of their ordinary duties, many men now barred from work as undue accident hazards could be allowed to work out their allotted span to the advantage of both themselves and their employers.

Low Back Pain

LOW BACK pain allegedly due to trauma is another problem constantly confronting the industrial physician. I think most doctors find these cases distasteful and are not accustomed to giving them the benefit of the same careful investigation they conduct when confronted with problem cases of other kinds—*e.g.*: I frequently receive medical reports read-

He *used to be* an Expert Die Maker

PROTECT YOUR WORKERS' SKILL WITH AO SAFETY GOGGLES

Not so long ago, this man was a die maker by trade. Now he is a pencil peddler by accident. Let his case remind you that unless there is a properly planned eye protection program in your plant, industrial eye accidents can rob *you, too,* of highly skilled, *irreplaceable* workers.

Let this blind man remind you, also, of the *high costs* of eye accidents . . . in medical and hospital expenses, lost time, lost manpower, lost production, idle machines, spoiled materials. Even the most minor case of "Lost-Time Eyes" costs far more than the AO Goggles that would have prevented it.

American Optical Company offers you a complete line of scientifically designed, comfortable goggles for every type of eye hazard. Trained AO Safety Representatives give freely of their time and experience to help your Safety Director safeguard eyes and dollars. Get in touch with your nearest AO Branch Office today.

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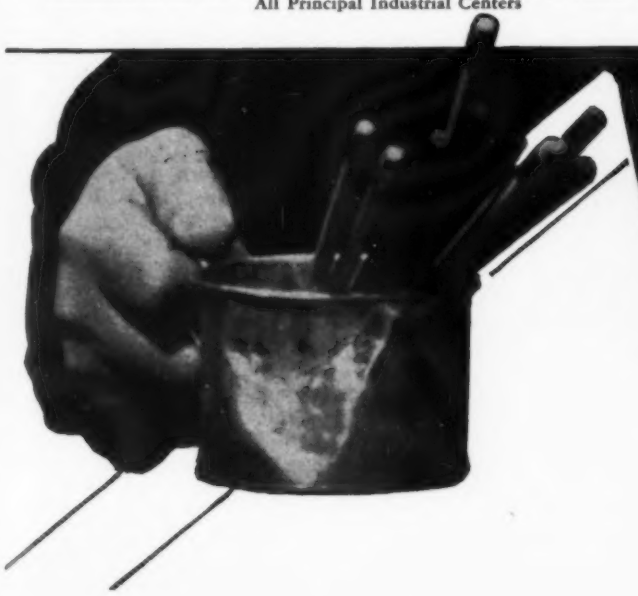

ing, in effect, "Patient was lifting hand-car and *strained* muscles of lower back." That is really the patient's diagnosis and not the doctor's. In many such cases there is no external evidence at all of a muscular or ligamentous strain and further investigation will, not infrequently, reveal that the pain did not commence for some hours after the event blamed by the patient, or, in other instances, that because of a chronic sore back the man was for some years known as the local druggist's best liniment customer.

Something else to look for in these aching backs is an inguinal hernia. I have seen three cases in the past two years in which a low back pain, present at work but not at rest, was relieved by the application of a truss. More frequently, however, I have had excellent results in cases of the lumbago (?) type by the deep injection of a long-lasting local anesthetic such as Eucupin, followed by stretching exercises during the period in which the anesthetic kept the patient pain-free.

We all appreciate, of course, that backache arises from many causes but I think it is too often forgotten that in a claimant for compensation the disability from a sore back may gradually be displaced by a psychologic disability.

Fifteen-Thousand-Dollar Fiasco

A FEW years ago I was in court in a Saskatchewan city over a case that appeared to be of this type. The claimant seemed to be an honest sort of man but it was my opinion that his organic disability was not very great. The only abnormality seen in his x-rays was a scoliosis at the fourth lumbar vertebra. Radiologists and orthopedic surgeons testified clearly and favourably on our behalf and a reasonable judgment against us appeared to be in prospect until an old chap who swore under oath that he was a doctor and had attended the claimant a few minutes after he was hurt gave his evidence. I wrote it down at the time. It went, in part, as follows: "I tried to forestall pneumonia and ankylosed the ribs to the lung by adhesive tape. There are 31 vertebrae. I saw that the 12th dorsal vertebra was slightly rotated. I lined up all the veterbrae above and below this joint but I was satisfied that the 12th dorsal was not in line." Later on he continued "I manipulated all the vertebrae into line with my fingers but could not keep the 12th one in place." When the old gentleman concluded his testimony the Judge said: "In other words he had a paralysis," and the jury, in due course, awarded the claimant $15,000.00.

Perhaps you would be interested in a few words on another type of back injury that very properly costs the employer a large sum of money, namely; fracture dislocations with cord injury. I had occasion, a few years ago, to inquire as to the life expectancy in these cases. The literature did not prove very informative but as a result of correspondence with a number of compensation boards and insurance companies, I learned that, contrary to popular opinion, these cases have a life expectancy of about one-quarter of normal and that a certain number of them will live for decades.

I have case histories on tuberculosis epididymytis manifesting itself some months after an alleged strain; on trigeminal neuralgia commencing five years after severe trauma to the face; on a man who undoubtedly cut his tongue in licking a manila envelope and subsequently claimed, when his tongue didn't heal and his Wassermann was positive, that the envelope must have contained spirochetes. Other claims that trauma or "strain" caused various types of cancers, appendicitis, peptic ulcer, epilepsy or apoplexy are all dealt with in the course of a year's work and serve, at least, to keep the industrial physician doing his daily stint of reading in order that he may comment intelligently on them.

This presentation has not by any means detailed for you all the problems or activities of an industrial physician. In some spare moments I dictate about five to eight hundred letters a month and stamp or sign my name some thousands of times. The industrial physician must at times feel that what are, after all, the not-so-far fields of private practice look enticingly green, but he is, nevertheless likely to conclude that his own work offers interest and satisfaction quite comparable to that of his fellow-practitioners.

Footnotes and Bibliography

1. Sold by Canadian Industries Limited under trade name "Protek."

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3. British Air Regulations No. 130, plus various additions.

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Women in Industry

—A Study of 135 Women Working as Riveters in the Aircraft Industries—

WILLIAM C. BRADBURY, M.D.,
and
CHARLES BENJAMIN S. EVANS, M.D.,
Santa Monica

ACCORDING to a recent survey published in the February number of *Fortune* magazine, about 12½ million women were in the war-working force by December of 1942. About three and one-half million more will be needed in 1943, giving a total of about 16 million women in essential work by the end of this year. A great many of these women are being employed in the aircraft industry. Sixty per cent of the employees in some plants are women already.

With the institution of numerous aircraft plants in California, thousands of woman throughout this state are replacing men at this work. It has been said that women are not physically equipped or emotionally stable enough to do all the kinds of work that men can do. This has, naturally, resulted in numerous problems. The solution, for the most part, has been in the hands of the industrial group of physicians whose training and past experience had been chiefly the prevention and treatment of industrial accidents and occupational diseases. There can be little criticism and much praise of the manner in which they have responded to a tremendous task.

On the whole, little interest has been shown in the problem by those in the medical profession not directly connected with this type of work. This is easy to understand, with the ever-increasing volume of private practice. It is for this reason that this paper is being presented in the Section on Gynecology and Obstetrics, rather than in the Section on Industrial Medicine. It is felt that those who, in the past, have been leaders in the field of gynecology and obstetrics should take an active interest in the protection of the health of women who are doing a big part in the winning of this war.

Council Recommendations

THE Committee on the Health of Women in Industry of the Section on Gynecology and Obstetrics, headed by H. Close Hesseltine, made certain preliminary recommendations to the Council on Industrial Health before the Fifth Annual Congress in Chicago in January of this year. The following general statement was made:

"Shortage of manpower and economic pressure necessitate the employment of millions of women in industry. Sufficient medical data are not available to draft final recommendations about the effect of various kinds of employment on the gynecologic or future obstetric health of women. . . . It is common experience in industry that women absent themselves from work more often than men, and that the duration of the individual absences tends regularly to be longer. The available data do not clearly assign the responsibility for this tendency directly to obstetric or gynecologic function (though it has been taken for granted by some) as against ordinary causes of disability which are equally applicable to men. All of these relationships need careful study over an extended period of time."

A review of the literature on the subject confirms the above report.

* Read before the Section on Obstetrics and Gynecology at the seventy-second annual session of the California Medical Association, Los Angeles, May 2-3, 1943; published in *California & Western Medicine*, August.

"If the woman eats bees . . ."

Among the many strange superstitions current in the Middle Ages, was the belief that if a woman would eat bees, she would not become pregnant.*

*Himes, *Medical History of Contraception*

• Today, quite logically, American parents turn to their family physician for authoritative advice on scientific methods of child-spacing. Medical research has provided methods and materials which, when prescribed for the control of conception, are effective and non-injurious. The efficacy of Ortho-Gynol Vaginal Jelly has been established by extensive clinical research. Its properties are so designed that it is not only active chemically but forms an obstructive barrier to the migration of sperm. Ortho-Gynol Vaginal Jelly was formulated on the basis of requirements published by authorities for preparations of this type.

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VAGINAL JELLY

Most articles deal with the subject of women in industry in a general way and few detailed reports are available. There are several surveys on postal clerks made by the United States Public Health Service. Their results indicate that women are absent much more often than men, but that the great majority of the absences are due to upper respiratory infections and other illnesses common to both sexes. Reports from all large centers reveal that from 5 to 15% of workers engaged in war work are daily being reported absent. The normal peacetime estimate is 2%. It has been determined that 35 to 50% of this so-called "absenteeism" is due to physical disabilities.

With the many new types of work being done by women, numerous unusual complaints are being heard. There have been rumors among the women workers that riveting causes "female trouble." Some of the local physicians speak of the condition as "riveters' ovaries." This has stimulated a study of this particular problem to prove it either as a fact or a fictitious rumor, unfounded on true experience and possibly arising as a form of propaganda.

Source of Material

ONE hundred and thirty-five women riveters with pelvic complaints were studied. Some were admitted to the Santa Monica Hospital by private physicians for treatment, and others were examined and studied by one of the authors in a medical group treating plant employees. These were chosen because of the complete work-up of the patients and accurate pathological diagnosis of the operated cases in the hospital. Patients who were pregnant and developed complications were eliminated because of the probable inaccuracy of the history in these cases.

Recorded Data

THE following items on each patient were recorded: age, previous occupation, pregnancies, operations, previous pelvic diagnosis, chief complaints, clinical findings on examination or pathological findings at operation.

Due to the prevalence of menstrual complaints, the following record was kept of these cases:

Menstrual history before employment as a riveter, including interval, duration, regularity, clots and dysmenorrhea, menstrual history since employment as a riveter, including interval, duration, regularity, clots and dysmenorrhea.

Results

TABLES 1, 2, 3, and 4 give information concerning the results.

Of the 135 women riveters studied, a pathological pelvic condition was diagnosed in all but five cases. Of the 54 cases of menorrhagia, 50 were examined and a pathological condition discovered in 49. No cause for the bleeding could be determined in two cases seen in the office, and two cases completely worked up in the hospital. The other case was one of hyperthyroidism.

TABLE 1.—*According to Age*

Ages 18-48 Years		
Under 20	8	6%
20-29	73	54%
3-39	38	28%
Over 40	16	12%

TABLE 2.—*According to Occupation*

Occupation—riveters	135	100%
Previous occupation—		
40 . . 30% Light work, such as clerks and waitresses		
95 . . . 70% Listed as housewives		
III—According to Personal History (Illness)		
Previous pelvic operations	30	22%
Pregnancies	84 62%	1-9 each
Previous pelvic complaints	11 8%	

TABLE 3.—*Menstrual History After Employment as a Riveter in Relation to the Previous Menstrual History*

Dysmenorrhea before riveting	81	60 %
Increase in clots with menstruation	33	24 %
Increase in dysmenorrhea	46	34 %
Development of interval irregularity	39	36 %
Increase in the duration	75	56 %
Decrease in the duration	3	2.2%
Menorrhagia	54	40 %
Aggravation of menstrual complaints	114	84 %
No change in menstruation	21	15 %

TABLE 4.—*According to Author's Diagnoses*

(Clinical and pathological diagnosis of the 135 patients)		
Chronic pelvic inflammatory disease	52	38 %
Fibromyomata uteri	33	24 %
Fibrous uteri and dysfunctional bleeding	13	9 %
Endometrial hyperplasia	14	10 %
Prolapse, rectocele, cystocele	9	6.5%
Cervical or endometrial polyps	5	3.7%
Endometriosis internal and external	4	3 %
Idiopathic uterine bleeding	4	3 %
Hyperthyroidism	1	7 %

Comment and Conclusions

THIS report is preliminary, for it has been difficult to establish controls in the eight months of the investigation. Only probable conclusions can be arrived at at this time. This evidence, based on the study of 135 riveters with pelvic complaints, is offered in support of our contention that pathological pelvic conditions are probably subject to aggravation in riveters. With the exception of five cases, there was definite evidence of previous pelvic pathology before employment as a riveter. The presence of four cases where no cause for the pathological uterine bleeding could be determined is too small a group to suggest probabilities, though the smallness itself infers that riveting probably causes no pathological condition in the pelvis, or at least not frequently. We have no evidence as to the mechanism by which pathological conditions in the pelvis are upset by riveting. There are two outstanding theoretical possibilities. The mechanical vibration directly disturbs the physiology of the ovary, which is already unbalanced by existing disease; or, indirectly, the patient becomes emotionally upset by the constant vibration and noise, and this affects the physiology of menstruation.

We further believe that a good number of manpower hours can be conserved by a careful history and, more important, by an adequate preplacement examination of the pelvis of women workers. Some plants have good preplacement examination routines, including a careful pelvic examination. Should should become universal. The number of manpower hours lost in transferring one riveter to another type of work after losing several weeks due to illness is very costly.

It has been worked out that the next large group of women to be taken into the war industries will be drawn from married women with children over 16 years of age. This means that fewer cases of pelvic inflammatory disease and abortions will be seen, and more cases of pelvic relaxations, dysfunctional uterine bleeding, carcinoma of the cervix, and the menopausal syndrome. These pathological conditions should be corrected before employment. Many of these patients are now under the care of their family doctor. An effort should be made to have these patients have an adequate preplacement examination. This should be our problem and responsibility to see that this is done. Industrial plants have a list of specialists who are consulted when needed. Dr. Hesseltine has recommended that a gynecologist and obstetrician should be added to this list where a substantial number of women are employed. We think that this is a step in the right direction. For example, very few plants require routine interval check-ups, and yet here is an unparalleled opportunity to reduce the mortality rate of carcinoma. Industrial physicians are doing an excellent work in protecting the health and welfare of the nation's large number of industrial employees. They need the experienced and trained specialist to control and study the problems of women workers, that adequate rules and regulations can be drawn up for their protection and well-being.

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Unions Endorse Blood Test

THE executive board of the California State Federation of Labor, meeting in Los Angeles, June 12, recommended that member unions require each applicant for membership to have a blood test made before admission into the union. The results of such tests are to be a matter of strict confidence between the examining physician and the applicant. The results under no circumstances are to be revealed to the union or to the employer and will have no bearing on the applicant's admission into the union. So far as is known, this is the first time that union labor has taken this sort of action anywhere in the United States, according to *California's Health*.

—*J.A.M.A.*, September 11.

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Industrial Medicine

A. J. AMOR, M. D. (Lond.), M.Sc. (Wales),
Chief Medical Officer to the Ministry of Supply

MEDICINE has been defined as the art or science of healing. This definition presupposes the existence of disease. It makes no mention of prevention or prophylaxis, nor does it comply with our more modern conception of the elimination of disease and the attainment of positive health. The study of the problems of the prevention of disease has received increasing attention in all quarters of the globe. In wartime the marshalling of forces, armed, industrial and social, places an increasing burden on the individual and the state. For each member of the state the burden must be interpreted in terms of service, and service—efficient service—demands an harmonious coordinated state of mind and body. This harmony of mind and body is called health.

During recent years there has been some discussion on the nature and function of what is now considered to be a special branch of medicine—industrial medicine. These discussions are by no means ended, and it is true to say that some perhaps needless controversy will continue. But two questions naturally arise. What is a special branch of medicine, and can such a branch of medicine be regarded as a specialty?

There are two broad divisions of medicine, medicine proper and surgery. A broad conception of medicine proper is that it treats disease by the administration of internal medicines. Surgery, on the other hand, treats disease by manipulative or operative measures. The practice of medicine has, however, divided itself by a slow evolutionary process into a number of well-defined groups depending upon certain needs, objects, principles and practice. Clinical medicine, the oldest and "purest" of the branches of medicine, comprises the study and treatment of disease at the bedside. Psychological medicine considers the causes and treatment of diseases of the mind. Preventive medicine is obviously what its name implies, and the medical officers of health are its true exponents.

If industrial medicine is to be considered as a separate branch of medicine, certain questions must receive an answer, and the first one is "What is industrial medicine?" The second, "What are its objects?" Industrial medicine may therefore be defined as the study of the working environment with the object of eliminating those causes of disease and ill-health which may arise within the factory, mine or shipyard. In practice it means more than that, for there is the larger problem of obtaining not only harmony of the mind and body of the individual, but the integration of the individual into a harmonious contented group. It is conceivable that if the optimum conditions of environment could be obtained, they would lead to the elimination of disease, except from the natural dysfunction of individual organs or the effects of age. This statement has some background in that the improvements in industrial and social conditions of the last 50 years have led to a marked increase in longevity. But the external surroundings and influences which affect the life of the individual are of the most complex nature and we may reasonably divide their study into two main groups—the home life and the factory life.

The Working Environment

BETWEEN the ages of 16 and 65 approximately one-third of our life is spent within the factory, shipyard or mine. If the environment of home is compared with that of the factory, one outstanding difference becomes evident. The environment of the home is one which the individual may alter at his own discretion. It is something which is within his own personal sphere of activity. This does not apply to the factory worker, and whether conditions are good or bad he must accept them and endure them if he is to live. It is self-evident, therefore, that the state must impose upon all occupiers of factories certain standards which protect the health of the worker.

The conditions governing industrial environment are laid down in the 1937 Factories Act and the special orders and regulations which have subsequently been made. They may be con-

From *Labour Management*, June-July, 1948.

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sidered as minimum requirements and govern, in the first place, those qualities of environment which are known as heating, lighting and ventilation. It must be accepted that these are established and enforced as minimum requirements. They are not necessarily optimum requirements, but industrial medicine willingly accepts these, determines the optima and, whenever possible, establishes them. In a similar manner the general provisions for welfare, such as drinking water, washing and first-aid facilities have been laid down. Industrial medicine will again consider in the light of the specific needs of the industry and its workers the conditions which are necessary over and above legal requirements.

Provision has been made in the 1937 Act concerning the notification and investigation of accidents and industrial diseases. Further provisions and regulations have been made governing the removal of dust and fumes. These are intimately related and due cognizance must be made of the great improvements which have accrued in the last quarter of the century. These improvements have been due to the excellent work of the Factory Department of the Ministry of Labour and National Service. But industrial diseases, whilst a matter of great importance, do not, as will be shown later, constitute industrial medicine. They are an important and, in fact, an interesting part of the whole subject. Further provisions governing environment are laid down in the Chemical Works Regulations. These regulations govern certain processes and demand regular examination of workers engaged on certain processes which have a direct effect on the health of the workers.

The 1937 Factories Act and the Chemical Works Regulations are concerned in great measure with environment. The harmful effect of environment upon the individual may result in disease or accident. Statutory provisions have been made for compensation for those injured or suffering from disease due to their occupation. These are embodied in the Workmen's Compensation Act and the Silicosis and Asbestosis Orders. No subject in the field of industrial medicine has given rise to greater difficulty than workmen's compensation, but these difficulties are not for discussion in this article. The important point is the recognition of a specific disease due to a known cause or causes. This primary study of the legal aspects of industrial medicine may be summarized as follows:

1. The minimum requirements for health, safety and welfare. 1937 Factories Act.
2. The specific control of a chemical process and the medical observation of the worker. Chemical Works Regulations.
3. Financial provision for the diseased or injured workman. Workmen's Compensation and Silicosis and Asbestosis Acts.

The Study of the Individual

But the influences of the whole field of environment can never be covered by miles of regulations or special orders. It is in the direction of the study of the individual and the group in the wider aspects of occupational environment that industrial medicine finds its wider application. Within certain limits the environment is, in so far as it concerns the worker, something unalterable. The basis for the study is the human quality of the worker himself. Too little attention has been paid to the individual and his place in industrial society and organization. His reactions to environment beyond those which result in a definite specific disease have received but little attention. The further reaction of management and authority, indeed of the individual worker himself, upon the environment of his fellow workmen, is a field which has yet to be investigated.

There are a number of factors associated with industrial life which require detailed consideration and their study must commence with the individual and the findings considered in relationship to the group. The group must be considered as part of the factory and the factory as a component of the industry. The essential is the study of the minutiae of the individual and his reaction to his work. This reasonable basis of approach brings into relief the essential nature and purpose of the individual. Work itself requires much thought and investigation. The machine has been given expert attention both in design and

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function. The man has been accepted. But the suitability of man to machine so that the best may be obtained from both and that the wear and tear of the former may be reduced to a minimum, requires much careful thought. This is the purpose of industrial medicine.

The chemist of the future will, before selling out the manufacture of his newly synthesized organic compound, ask the industrial doctor to have its toxicity and harmfulness investigated. The engineer who is responsible for designing plant will also consult the doctor concerning the suitability of the plant and its operation in relation to the health of the worker. The industrial architect will consult the medical man on the design of the factories of the future. The injured worker will receive the full attention of the rehabilitation clinic. The auxiliary medical services will attend to the vision and teeth of the worker. All will be directed to the establishment of good health, based on the recognition that healthy function and not morbid conditions must be the study of the future. But more. There is a field of activity in things human beyond, yet complementary to, those of industrial medicine. The development of personnel management has been left until the last paragraphs. Industry has recognized the paramount importance of the function of good personnel management. Medicine no less has welcomed it as a sister art and science. Together these two can change the face of industry—in a number of instances they have already done so. Those who have studied medicine and personnel management in industry will welcome wholeheartedly their future cooperation. Alone, either can do much; together, in harness, they can make the greatest contribution to the industrial and economic development of British industry so that in peace as in war it can face the world.

Standing Orders

—For Nurses in Industry—

(Prepared by the Council on Industrial Health of the American Medical Association)

FOR some time the medical and nursing professions have been concerned about the employment of nurses in industry without adequate medical supervision. The Council on Industrial Health has therefore been requested to formulate standing orders for industrial nurses which can be adapted to meet the requirements of individual industrial medical departments. If no responsible industrial medical authority exists, it is recommended that the nurse request helpful instruction in this regard from the committee on industrial health of the appropriate county or state medical society.

General Relationships

STANDING orders represent a preliminary understanding between physician and assisting personnel about routine conduct of a medical service. In establishing such orders in an industrial medical department, several considerations need to be borne in mind:

1. The greater the amount of personal supervision exercised by the physician directly in the industrial environment, the better is the industrial health service.

2. Standing orders cannot be written to meet every situation likely to arise in industry. They must be modified to meet specific requirements and in accordance with the training and professional competence of the assisting personnel. They should be signed by the supervising medical authority and posted prominently in the medical department.

3. The nurse in industry should assume no responsibility for service outside the field of her professional training. This applies particularly to individual case management, from which the nurse should rigidly abstain except:

(*a*) In emergencies demanding immediate independent judgment and action.

(*b*) Procedures of preliminary or first aid nature routinely required by reason of the nature of the work and which are clearly stipulated in the standing orders.

This statement confines itself mainly to these last named aspects of medico-nursing relations in industry. Additional reports on other functions of industrial nurses will follow from time to time as needed.

Emergency Procedure in Industry

GENERAL principles which operate in all emergency situations apply to industry as well. They are:

1. Call a physician immediately.
2. Stop bleeding.
3. Restore breathing.
4. Prevent shock and infection.
5. Do no more than is actually needed.

Published in *J.A.M.A.*, August 28, 1943.

Triumphs in Triage*

*MEDICAL triage in war—front-line classification of casualties—is among the toughest assignments of the military physician. Instant diagnosis—often under direct fire—countless variations—new, baffling situations.

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New reprint available on cigarette research — Archives of Otolaryngology, March, 1943, pp. 404-410. Camel Cigarettes, Medical Relations Division, 1 Pershing Square, New York 17, N. Y.

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The supervising physician should assure himself that these instructions are thoroughly understood and should institute special training when necessary. Nurses in industry should qualify as first aid instructors.

Emergency Supplies. — Emergency packs with essential sterile supplies should be available at all times in the medical department and in first aid kits suitably located throughout the plant Regular inspection is necessary.

Hemorrhage.—Bleeding calls for immediate attention. The nurse should notify the physician and, until he arrives, proceed as follows:

1. Expose the wound.
2. Remove obvious foreign matter.
3. Apply pressure.

Direct manual or bandage pressure firmly applied over sterile gauze packing at the bleeding site will effectively control moderate hemorrhage. Indirect compression is indicated in excessive bleeding not controllable by direct methods. Digital compression over the vessel against underlying structures either adjacent to the wound or at the nearest pressure point will usually suffice until the physician arrives. Indirect pressure should be applied proximal or distal to the wound, in keeping with the arterial or venous character of the bleeding. Hemostats or clamps should be applied whenever the emergency warrants it.

Avoid applying a tourniquet if possible. If severe bleeding in an extremity suggests the use of a tourniquet, apply a blood pressure cuff.

The nurse should remember that:

1. A direct pressure bandage should not act as a tourniquet.
2. A tourniquet must be periodically released at least every 15 minutes.
3. No dressings should be applied over a tourniquet.
4. Asepsis must be observed at all times.

Asphyxia.—Cessation of breathing from any cause demands:

1. Artificial respiration *at once* and *at the site of the accident.*
2. Notification of the physician.
3. Maintenance of body warmth. Avoid excessive heating.

All industrial nurses should demonstrate ability to apply artificial respiration by the prone pressure method and should realize the need for its continuous application until breathing is restored or until careful repeated medical examination advises otherwise.

Shock.—Early and adequate shock treatment is life saving. Do not delay.

Common symptoms of shock following injury are pallor, perspiration and rapid thready pulse. Emergency management by the nurse should include:

1. Notification of the physician.
2. Removal of cause. If shock is due to hemorrhage, control it. If it is due to trauma not associated with bleeding, all active treatment of injury should be deferred until shock management has been instituted. Wounds should be covered with sterile dressings to prevent infection.
3. Relief of pain: 1/6 to 1/4 grain (0.010 to 0.016 gm.) of morphine sulfate, repeated if necessary, or barbiturates as routinely ordered except in injuries to the head or trunk.
4. Keeping the patient warm, dry, and on his back with his head low. Avoid overheating.

Routine Nursing Care of Injuries

SUCCESSFUL medical management of industrial injuries depends on:

1. Prompt treatment.
2. Meticulous cleansing and dressing.
3. Examination of deep as well as of superficial structures.

To accomplish these aims the routine functions of the nurse should be confined to care of minor wounds as follows:

1. Protect wound with sterile gauze while adjacent area is cleansed with soap and water or solvent.
2. Discard protective dressings and clean wound margins.
3. Irrigate wound with sterile water or isotonic solution of sodium chloride.
4. Apply antiseptic of physician's choice.
5. Apply dry sterile dressing, interfering as little as possible with function. Sterile dressings should be covered with protective material for use at work. The worker should be instructed not to remove the dressing but to return to the medical department if it becomes loosened or uncomfortable.

The nurse should do no more than is actually needed. The following conditions require direct medical supervision:

1. Wounds requiring débridement.
2. Those with obvious or suspected involvement of deep structures.
3. Wounds with edges which do not approximate.
4. Wounds about the head and face.

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5. Contaminated wounds requiring tetanus prophylaxis.

Management of Common Injuries.—Injuries most likely to be encountered in industry include the following conditions:

1. Abrasions: Clean and apply dry dressing. Extensive or deep loss of skin, especially about the fingers and hands, needs medical attention.

2. Contusions: Treat with cold compresses directly following injury, later with moist heat. If soreness or disability persists or if deep involvement is suspected, refer to the physician.

3. Lacerations: Clean and apply dressings as directed. Any possibility of injury to joints, nerves or tendons should be brought to the physician's attention at once.

4. Puncture Wounds: Puncture wounds through the skin need direct medical supervision to avoid or treat severe infection. If superficial, clean and apply sterile dressing.

5. Slivers and Splinters: Penetration through the skin by slivers or splinters always carries the risk of an infected puncture wound and should be treated as such. Those lodged superficially and easily removed without added trauma or incision may be extracted aseptically by the nurse.

6. Burns and Scalds: Clean minor burns with soap and water. Apply petrolatum or 5% boric acid ointment, bandaging firmly without interfering with function. Leave blisters alone.

In all other cases:

(*a*) Notify the physician.

(*b*) Cover the burned area with a sterile dressing or sheet moistened with isotonic solution of sodium chloride or 5% sodium bicarbonate solution.

(*c*) Combat pain and shock.

In the absence of specific orders, chemical burns should be treated by irrigation or immersion in water for at least 20 minutes and then by dressing.

7. Sprains and Strains: Treat first with cold compresses, elevation of the part and rest. A physician's advice is necessary regarding strapping, other methods of support or fixation, further examination or special therapy.

Fractures

PRELIMINARY steps for the nurse:

1. Call a physician at once.

2. Keep the patient quiet and warm.

3. Immobilize before any movement is attempted.

4. Do not attempt reduction.

5. If the fracture is compounded, cover the site of the fracture with a dry sterile dressing. *Do not cleanse or reduce.*

Special instruction in splinting should be provided every industrial nurse.

Eye Injuries

RIGID aseptic technic must be scrupulously observed in all eye conditions. Never attend consecutive patients without sterilization of instruments and careful hand washing. Remember that early symptoms of infection simulate foreign body.

Minor Burns.—Do not apply ointments to minor burns of the skin about the eye. Apply a sterile dressing and refer to the physician.

Burns of the Eye. — 1. Chemical Burns: Irrigate chemical burns of the eye *copiously* and *at once* with water, preferably by immersion. Neutralizing solutions are usually inadequate or unavailable. The rapidity with which the irrigation occurs is more important than the type of solution used. Continue to irrigate at least 20 minutes by the clock.

2. Hot Metal Burns: Apply a sterile pad and refer at once to the physician. Do not irrigate. An anesthetic should be applied as ordered by the doctor.

Every burn of the eye should receive competent medical attention early.

Foreign Bodies.—The nurse should attempt to remove only those foreign bodies of the eye which can be readily located and which can be easily washed out or removed with a dry sterile cotton applicator. An antiseptic may be applied if the physician so orders.

Direct medical care is essential:

1. If the foreign body cannot readily be located. Stains to aid in the location of foreign bodies should be used only on specific medical order.

2. If removal requires any instrumentation.

3. If irritation or pain persists after removal.

No person with an eye injury should be discharged without examination by a physician.

"Flash" Injury.—First aid treatment should include:

1. Local anesthetic as ordered.
2. Cold compresses.
3. Sedatives.

Persistent pain following flash needs medical examination and treatment.

Conjunctivitis. — Conjunctivitis or other forms of conjunctival irritation should be referred routinely to the physician or ophthalmologist.

Head Injuries

UNTIL the physician takes over, the nurse should:

1. Keep the patient lying down.
2. Elevate the head.
3. Apply ice cap or cold compress. *No sedatives.*
4. Record pulse and respiration every 10 minutes.

Clip or shave and cleanse areas adjacent to scalp lacerations, and cover with a sterile pad.

Chest and Abdominal Injuries

CONTUSIONS of the chest and abdomen with or without external evidence of injury may result in trauma to underlying organs.

Until seen by the physician, such patients must be:

1. Kept warm and quiet.
2. Allowed no sedatives.
3. Have pulse, temperature and respiration recorded frequently.
4. Suitably bandaged to avoid contamination.

In case of abdominal injury give nothing by mouth.

Non-Occupational Illness

TREATMENT of injury or illness which has no relation to occupation is not a function of the industrial medical department except:

1. First aid for emergency sickness. Such measures as the situation demands must be taken until notification of the family physician discharges responsibility.
2. For minor ailments which temporarily interfere with an employee's comfort or ability to complete a shift and for the relief of which a physician would not ordinarily be consulted.

In all relationships of this kind, judgment and tact are required of the industrial nurse. Several principles apply:

1. Before giving any treatment, the temperature, pulse, general appearance and a history of the presenting complaint should be recorded.
2. Palliative treatment, especially for chronic or recurring disorders, should not be repeated.

Every properly trained nurse understands the difference between attention of this kind and systematic treatment.

Minor Illness and Symptoms

PERSISTENT or augmenting symptoms of irritation, discomfort or disability suggest faulty work environment. The nurse should not hesitate to ask for medical examination of workers and of the premises.

Fever.—A rise in temperature of 1° suggests medical consultation before work is resumed. Findings should be checked by repeated thermometer recordings.

Headache.—Record temperature. If headache is accompanied by dizziness, nausea, vomiting, stiff neck, injury, history of recurrence, fever, general malaise or other symptoms the patient needs medical attention. If not, give an analgesic as ordered by the physician.

Remember that headache or dizziness may be premonitory signs of intoxication.

Unconsciousness. — 1. Fainting. Usual symptoms are pallor, with shallow breathing, slow and weak pulse. Period of unconsciousness is of short duration.

Keep the patient lying down with head lowered until fully recovered. Be sure the patient has plenty of fresh air. Clothing should be loosened and stimulating inhalants used, such as ammonia or smelling salts.

2. Other causes. If other signs are present or if unconsciousness persists longer than a few minutes, call for medical assistance. *Give nothing by mouth.*

Toothache.—If there is a cavity, the nurse may pack it with cotton dipped in oil of cloves for temporary relief. For further examination and treatment refer to a dentist.

Nosebleed.—Spontaneous nosebleed may be treated by cold packs or pinching the sides of the nose against the septum. Keep the patient sitting erect or standing and loosen the collar if it tends to constrict the neck. Advise the patient not to breathe or blow through the nose for an hour or two after bleeding has stopped.

Bear in mind that certain occupational exposures are manifested by nasal damage and bleeding.

Sore Throat.—Patients with sore throat may be given a hot saline gargle if they have a normal temperature. Do not "paint" the throat. Any persistent sore throat or one with fever needs medical care at home.

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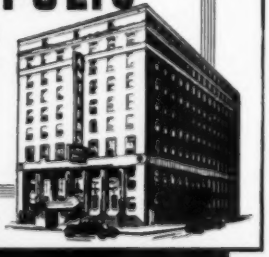

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Respiratory Irritation or Infection.—Repeated or persistent signs of bronchial or chest irritation without associated infection suggests an unfavorable occupational exposure. A plant hygiene survey is indicated.

Persons having acute respiratory infections with elevated temperature, cough, sneezing or nasal discharge should be sent home for proper segregation, rest and medical attention. In mild infections, work may be continued if under medical or nursing supervision simple measures will control symptoms and prevent spread.

Available medical evidence at the present time cannot support routine administration of cold vaccines or vitamin preparations as methods of reducing the incidence or severity of acute respiratory infections.

Frequent colds or chronic respiratory conditions require special medical consideration.

Abdominal Distress.—Early signs of occupational intoxication may be abdominal in character. In any case abdominal distress, nausea or pain, especially if severe or persistent, requires competent medical diagnosis and management.

Laxatives should never be dispensed from an industrial medical department.

Dysmenorrhea.—Painful menstruation not associated with fever or gastro-intestinal disturbances may be treated with an analgesic ordered by the physician and the patient placed at rest with heat to the lower part of the abdomen. If there is no relief or if other signs or symptoms present themselves, she should be referred to her physician.

Patients with recurrent severe dysmenorrhea should not be given palliative treatment. They should be referred for examination and treatment.

Dermatitis

MANAGEMENT of skin disorders in industry depends on cause.

Specific Irritants.—Materials or processes in the plant capable of causing skin disease should be identified and special orders provided for control. Competent dermatologic consultation is essential in all obscure or refractory situations.

Nonspecific Skin Disease.—Nonspecific skin irritation in industry is almost entirely assignable to faulty personal hygiene. The nurse can do much to improve washing routine, the use of dependable protective coverings, the wearing of clean work clothing, maintenance of satisfactory housekeeping in the plant and the general maintenance of accepted hygienic procedure.

Pregnancy

A DEFINITE policy regarding employment during pregnancy should embrace the following recommendations.

1. The employee should notify the proper authority in industry about her pregnancy within the first trimester.

2. She should obtain a statement from her own physician—

(*a*) That her work is not contraindicated.

(*b*) Regarding the length of time she should work.

3. Special attention should be given to the nature of the work. Pulling, pushing and lifting must be kept within safe limits. Rest periods will tend to minimize emotional and physical instability during pregnancy.

4. Ordinarily work should terminate by the thirty-second week (within six weeks of term). If contraindications arise within this period, the employment should stop.

5. Return to work is inadvisable before six weeks after delivery and then only on notification of the employer by the physician.

Equipment and Supplies

SPACE which can command privacy and which can be kept clean and properly prepared for emergency and routine services by the nurse should be provided in the plant. Special attention should be given to heating, light, ventilation and accessibility.

The accompanying check list of furnishings and supplies suitable for a small plant dispensary should be augmented by equipment for emergency treatment or other special medical requirements as ordered by the plant physician or other medical adviser.

References

American Red Cross First Aid Text Book, P. Blakiston's Son & Co., Inc., 1012 Walnut Street, Philadelphia.

Furnishings and Supplies

General Furnishings:
1. Sink
2. Instrument cabinet
3. Sterilizer
4. Dressing table
5. Leg rest
6. Cot
7. Stretcher
8. Mirror 10 by 12 inches
9. Foot-pedal waste can
10. Waste basket
11. Storage cabinets
12. Paper towel rack
13. Adhesive rack
14. Record file
15. Scale

Instruments and Supplies:
1. Scalpels
2. Splinter forceps
3. Tissue forceps
4. Hemostatic forceps
5. Bandage scissors
6. Surgical scissors
7. Hand magnifying glass
8. Syringes
9. Assorted hypodermic needles
10. Assorted surgeon's needles
11. Needle holder
12. Assorted bandages
13. Adhesive plaster
14. Cotton
15. Applicators
16. Assorted sutures
17. Assorted splints
18. Assorted jars and basins
19. Test tubes
20. Safety razor and blades
21. Hot water bottle
22. Ice cap
23. Crutches
24. Tourniquet

Drugs: (as ordered by the physician or medical adviser)
1. A stimulant
2. An emetic
3. Analgesics and sedatives
4. Antiseptics

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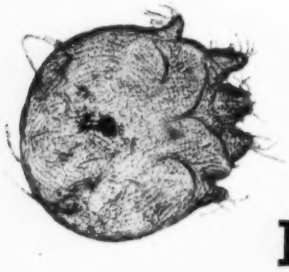

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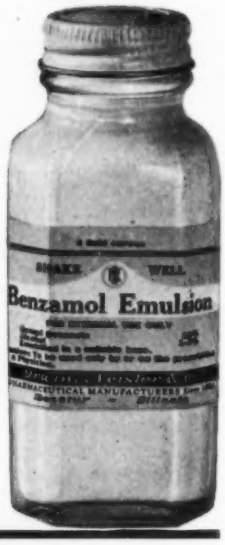

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(*a*) The Industrial Medical Department.
(*b*) Plant Hygiene Studies.
(*c*) Outline of Procedure for Physicians in Industry.
(*d*) Women in Industry.
(*e*) Control of Common Respiratory Infections.
(*f*) Indiscriminate Administration of Vitamins to Workers in Industry.
(*g*) Recognition and Prevention of Industrial Dermatitis.

Kaiser's Way of Giving Men Medical Care

—Book Review by—
IRVING S. CUTTER, M.D.

KAISER WAKES THE DOCTORS, by PAUL DE KRUIF. Published by Harcourt, Brace, $2.00.

PAUL DE KRUIF always writes entertainingly. This means that everything he produces is read. But he is a searcher after copy and everything glistens which comes within his purview.

Now comes his description of Henry J. Kaiser's plan for the medical care of his employees (not their families). Of course, the program is not new. Scores of industries have laid the foundation for better health supervision and prompt medical service to workers.

The reader is given an excellent picture of the business acumen of DR. SIDNEY GARFIELD, who found that several thousand persons engaged in construction work in the California desert just would not pay the doctor. Author De Kruif infers, therefore, that "there is something evil about money busines between the doctor and the sick man." This calls to mind the rhyme:

"The devil was sick—the devil a monk would be;
"The devil was well—the devil a monk was he."

HOW did GARFIELD get paid? He persuaded the employers to deduct a few cents a day from the wages of the men. With what result? In five years, GARFIELD had paid good salaries to his physicians and nurses, had built three hospitals, possessed them clear of debt, and had a reserve of $150,000.

It may well be doubted if the employed doctors were the "happiest of all"—as De Kruif states. They were transformed from independent practitioners to salaried hirelings.

Most of us, I am sure, have a deeper respect for the ability of Henry Kaiser than we would gather from this volume. De Kruif calls him a graduate of the seventh grade, with a genuis for construction. This is certainly correct. But his wisdom and knowledge of human psychology, his ability to obtain cooperative action, transcends the training of school or college. A human psychologist of discernment, he applied a sound business principle—namely, insurance, to safeguard his employees. Every one who works for him pays 50 cents a week and this has been adequate to cover hospitalization and an operation if required, carry the individual through a case of pneumonia, or manage a case of incidental illness. It is safe to say that the sum ($26 a year) would be accepted by many insurance companies as a sufficient premium for this.

ONE of De Kruif's chapters is entitled "Amazing—They Stopped Dying!" The chances are that while the medical care is good it is no better than under reasonably well organized practice. If Mr. Kaiser had made available good physicians, had guaranteed them a decent living, and provided a hospital where they could work—the care now afforded the em-

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ployees could have been extended to the members of their families.

As an example of De Kruif's long bow tendencies, he asserts that draftees classified as 4-F are, in large part, "physical wrecks because they never did have decent medical care." Were De Kruif a physician (which he is not), and had he worked in a fair-sized hospital for a period of a dozen years or more, he might have been more respectful to the hard working medical men of our land. The volume sets forth a well deserved criticism against mountebanks—those who make money their goal and who are utterly indifferent to the wails of humanity. The author also indulges in an indictment of "the invisible hand from Chicago" (American Medical Association).

He makes it clear that Kaiser believes the people do not need "government handouts." What they want is an opportunity to develop for themselves a system of medical care which will serve efficiently and within the patient's means. To all of which we say—amen.

THE TALE not only is engrossing—for de Kruif knows how to marshal his facts and infuse them with life—but of social importance. It leaves no doubt that much can be done to distribute medical care rationally, and at low cost, to what the Bureau of Census calls "the gainfully employed," if the Kaisers in industry are given free rein.

From a review by WALDEMAR KAEMPFERT, in *New York Times*.

The War Injured

Book Review by
JOSEPH L. FETTERMAN, M.D.

REHABILITATION OF THE WAR INJURED. A symposium edited by WM. B. DOHERTY, M.D., and D. D. RUNES, PH.D. Philosophical Library, N. Y.

REHABILITATION of the War Injured is a timely book of 684 pages. It is a symposium consisting of 53 chapters with corresponding number of contributors.

The material is divided into seven sections. The first deals with neurology and psychiatry, the second and by far the largest division covers the subject of reconstructive and plastic surgery. A third portion takes up certain orthopedic problems, while the fourth is devoted to physiotherapy. The next group of papers is under the heading of occupational therapy and vocational guidance. Two brief sections, one on legal aspects and the last on vascular and neurologic lesions in survivors of shipwreck, close the book. Thus the subject matter is quite diversified and touches many aspects of the problem.

Many of the contributors are among the leaders in their respective specialties here and in Great Britain. The authors include Denny-Brown, Cobb, and Cairns in neurology; Blair, Sheehan and Gillies in plastic surgery; Smith-Petersen in orthopedics; Griffiths and Kratz in vocational guidance, to mention but a few. Some of the chapters represent a well rounded analysis of the particular subject, others are but re-publications of single articles which have appeared elsewhere, a few are quite brief.

Written by some 50 different contributors, there is an understandable unevenness, some repetition, and the sequence of subject matter is not altogether smooth. To a certain extent this lack of unity is compensated by the variety of authorship.

Viewed in its entirety, the book is timely and presents in one volume a fairly satisfactory discussion of this current subject. Its emphasis is upon reconstructive measures, upon techniques of plastic and orthopedic surgery and upon physiotherapy. But insufficient emphasis is placed upon the two most important even if intangible factors in rehabilitation: the mind of the injured man, and the industrial opportunities for the handicapped. True, several contributors touched upon this aspect. Lennox and Cobb write about employment of epileptics. Kratz, Johnstone, and the papers by Cairns and Jefferson deal with psychological and industrial problems. One may also mention two minor defects, poor reproduction of some photographs and the absence of an index.

The book as a whole is a valuable and up-to-the-minute discussion of a subject of growing importance. He who deals with the injured may find instruction and guidance.

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—*Continued from page 50*

urged that the unions develop an education program. "No other group of adults in this country offers a greater opportunity, a greater promise of fruitful results in health education, than union members. The development of a good health and safety program actually depends upon the growth in health knowledge and health skills by the workers themselves." The Medical Research Institute of the union has prepared detailed and comprehensive clauses for inclusion in future contracts. These may be obtained from the Medical Research Institute at its Detroit headquarters.

—From *Industrial Hygiene*: Current News of Official Industrial Hygiene Activities, September, 1943.

Who Gets Dermatitis?

WE CLASSIFY all occupational dermatoses into two main groups: (1) folliculitis—that rash characterized by pimples, pustules and "oil boils" occurring as the result of plugging of the hair follicles on exposed surfaces; and (2) eczematoid—that rash characterized by scaling, weeping, cracking, roughening or itching. We think of folliculitis as resulting from mechanical plugging of the pores with the industrial contact followed by secondary infection; and we think of the eczematoid group as manifestations of allergic or hypersensitivity tendencies. Young men with dark, thick, oily, hairy skin, particularly if acne is present, are prone to develop folliculitis; whereas men and women with light (blonds and "redheads"), thin, dry, smooth skin are prone to develop eczematoid rashes. Petroleum oils, greases, waxes, paraffin and the like produce the folliculitis in the oily, dark-skinned group; whereas the dry, smooth-skinned group do better. Soaps, turpentine, naphtha, gasoline, benzol, carbon tetrachloride, trichlorethylene, tetrazine, toluol, resins, coning oils and other alkalies, petroleum distillates and coal-tar distillates commonly produce eczematoid dermatitis in the blond, dry thin-skinned group; whereas the dark, thick, oily skins do better.

—From "Who Gets Dermatitis?" by DR. JOHN N. GALLIVAN, in *Occupational Hazards*, September.

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by Joseph L. Fetterman, M.A., M.D.,

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This Industrial Hygiene Section is published to promote sound thought upon and concerning industrial hygiene. To that end it will contain articles, discussions, news items, reports, digests, and other presentations, together with editorial comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited.

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The Editorial Committee will exercise its best judgment in selecting for publication the material which presents most exactly the factors affecting industrial health and developments for control of potentially injurious exposures. The editors may not concur in opinions expressed by the authors but will endeavor to assure authenticity of fact.

The Science, the Law and the Economics of Industrial Health

Volume 4 | October, 1943 | Section 4

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Post-War Industrial Hygiene

ESSENTIALS only are the order of the day as manpower and material shortages become increasingly critical. Among the services which have stood the test of essentiality is industrial hygiene. We refer not to the static condition of good plant sanitation, desirable as this is, but to the dynamic procedure of close control of industrial health hazards through well trained industrial hygiene personnel: the noting of potentially hazardous materials and operations; the evaluation of their relative severity through determination of the extent of exposure, using chemical, physical and physiological test methods; the instigation of control measures where necessary; the positive check on adequacy of such methods; the establishment of reliable toxic limits of injurious materials through correlation of exposure with physiological response.

Such industrial hygiene services are being provided at this time by Federal, state and municipal bureaus, and through insurance companies, manufacturing and mining concerns, organizations, universities and private consultants. But what of industrial hygiene after the war? Will the change from present manpower shortage to an abundance of eager job seekers result in a lessened interest in industrial hygiene?

It is our belief that the fundamental advantages of industrial hygiene both to management and labor have been so sufficiently demonstrated that it will continue to progress during and after the transition period following the war.

There will be the demands of labor that working environment be such as to cause no injury to health. To these will be added the insistence of the government that our adult manhood be maintained at a better health level than that disclosed through physical examinations under the Selective Service System. Intelligent managements will see to it that their workers are kept alert physically and mentally even though potentially injurious materials or processes are to be utilized.

Wth the more extensive use of such materials and processes throughout industry, there will be increasing need for industrial hygiene services at present available. In addition, a greater number of the larger industrial concerns will find that industrial hygiene divisions within their own organizations pay real dividends. Occupational diseases can be markedly reduced and under most circumstances entirely eliminated. Production is advanced where health of workers is not impaired. Industrial relations are furthered when workers have real evidence that management is providing working conditions which are favorable rather than detrimental to their health.

Just what development of industrial hygiene activities will the manufacturer find best adapted to his operations?

In the larger industrial organization, perhaps with multiple plants, there should be a headquarters laboratory specially set up for occupational disease control with a well trained industrial hygienist having chemical or chemical engineering background. This industrial hygienist should have not only broad experience in manufacturing operations which present health hazards and the control of them but also the type of personality which will permit him to work well with plant superintendents and personnel, medical and safety departments.

The nucleus of the industrial hygiene division should also include a chemist to conduct the greater part of the laboratory determinations, many of which involve methods for which the plant control laboratory is not ordinarily available either in apparatus or in techniques.

These larger concerns may well consult existing industrial hygiene services such as those in the state departments, insurance carriers or private organizations such as the Industrial Hygiene Foundation of

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America in making their plans for incorporating a division to handle this subject in their plants. A number of industrial concerns which have already been operating such divisions over the past several years will have much assistance to offer based on actual experience.

Where smaller manufacturing concerns are confronted with occupational disease exposures, they may maintain closer control over the exposures by assigning responsibility to some appropriate person in the plant. Whether that person should be the safety engineer, the plant nurse, the chemist or the plant engineer depends upon local conditions. Here again the industrial hygiene services can be of much guidance in laying out the problem and a procedure for positive control.

With industrial hygiene services available today, there need be no appreciable incidence of occupational diseases even in the most hazardous of operations—with the exception of industrial dermatoses, which will continue to occur. In order to assure the virtual elimination of the occupational diseases, it will be necessary to extend the application of present industrial hygiene methods so that injurious exposures are avoided or brought under control before actual injury to health occurs.

In looking forward to post-war industrial hygiene, there will undoubtedly be a broadening of scope to include correction of so-called nuisance conditions caused by obnoxious but non-toxic dusts, gases and odors. The industrialist of tomorrow will pay more attention to the provision of favorable working conditions both as these favor profitable operation and as labor and government exert greater influence for such an environment. It is not to be inferred that an Utopian condition will come out of the war. Economics, idiosyncrasies of human nature, failures to anticipate situations will all be factors which will continue to introduce problems for the industrial hygienist to contend with. We believe, however, that there will be a wider recognition of the desirability of improved occupational environment and of the essentiality of industrial hygiene divisions having well trained and experienced personnel, equipped with the necessary field and laboratory apparatus to be charged with the responsibility of maintenance of good industrial hygiene.

Chlorinated Solvent Exposures

—At Degreasing Operations—

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SATISFACTORY coating of metal depends, among other factors, upon the degree of cleanliness of the object at the time of coating. To meet the requirement of a fast efficient method to remove grease, oil and dirt, chlorinated solvent degreasing was developed. Degreasing units generally employ trichlorethylene as a solvent under numerous trade names, such as permachlor, triad, blacosolv, and tromex, but in 1939 degreasing units employing perchlorethylene (tetrachlorethylene), under the trade name of Phillsolv, appeared on the market.

The health hazard associated with chlorinated solvent degreasing has been a problem of much debate. While it is generally accepted that these chlorinated solvents are toxic if inhaled in sufficient concentrations over extended periods of time, the problem in the field has received little study. The mere fact that a material is toxic does not necessarily imply that a hazard develops with its use. It is only through detailed field study under its actual use that the health hazards inherent in its application can be deduced. Laboratory researches, under controlled conditions, while highly desirable, can not be assumed to provide the solution. Theory and practice vary considerably in most cases, but both supply essential data. It is hoped that this study will provide part of the necessary field studies for determining the health problems associated with chlorinated solvent degreasing in the available marketed units.

Scope of Study

THE Division of Industrial Hygiene of the Illinois State Department of Public Health undertook this study of degreasing machines during 1942, with the major part of the work conducted during the last half of that year. The general scope of the study was as follows:

Presented at the Fourth Annual Meeting of the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION, Rochester, New York, May 25, 1943.

Number of Plants	60
Number of Machines	108
Ventilated condensing	39
Non-ventilated condensing	58
Enclosed, automatic	7
Non-condensing	11
Number of atmospheric vapor determinations	433

All machines were units employed in industry and the atmospheric samples were made during normal degreasing operations.

The trichlorethylene solvents encountered in these degreasing units were perm-a-clor, triad, blacosolv and tromex, while phillsolv[1] was the only perchlorethylene solvent in use. The chief difference in these trichlorethylene solvents is in the degree of stabilization. Today, they are stabilized to different degrees and marketed under certain trade names to meet the different requirements of industry. Chlorinated solvents, without stabilization, will break down, liberating free corrosive hydrochloric acid through three fundamental causes: presence of air (oxidation); presence of water (hydrolysis); and high temperature (pyrolysis). While oxidation inhibitors are available for stabilization, one manufacturer of chlorinated solvents[2] states that no successful inhibitors of either pyrolysis or hydrolysis are known. Stabilization, however, has nothing to do with specific toxicity of the solvent.

Table 1 reveals some of the physical properties of trichlorethylene and perchlorethylene.

Of particular interest are the vapor pressures and vapor densities of these solvents. The relative evaporation rates of these two solvents is about 3 to 1, with

TABLE 1.
PHYSICAL PROPERTIES OF CHLORINATED SOLVENTS

Solvent	Trichlorethylene C_2HCl_3	Perchlorethylene C_2Cl_4
Boiling Point—° F.	188.1	249.4
Latent Heat of Vaporization (Btu./lb.)	103.1	90.1
Vapor Density (Sp. Gr. Air = 1.0)	4.5	5.7
Vapor Pressure (@ 30° C)	91.0	28.0
Sp. Gr. 20°/4° C.	1.46	1.62
Molecular Weight	131.38	165.83

perchlorethylene having the slower evaporation rate. While such physical constants are of interest, they are not indicative of the relative atmospheric vapor concentrations, since it is the vapor which is the chief degreasing medium. These constants would be of more importance if these solvents were used cold. We are not qualified to judge the merits of both solvents for degreasing. On the basis of the physical properties alone, particularly the boiling point and latent heat of vaporization, it appears that perchlorethylene, if it is satisfactorily stabilized, is favored. However, this conclusion is based upon its use in a condensing type of machine. Its use today is not in machines with condensers. This does not imply that equally as good degreasing can not be accomplished with trichlorethylene.

Toxicology

THE opinions of medical authorities in regard to chronic or acute poisoning from trichlorethylene or perchlorethylene are by no means unified. Nevertheless, both solvents are regarded as toxic. There is only one published medical research study in this country with which we are familiar. Nor were we acquainted with any more than two cases of solvent poisoning from machine degreasing that were compensated by the industrial commissions of the various states up to this year. However, in the early part of this year, the New York State Department of Labor reported that two fatalities of persons employed at degreasing operations in which trichlorethylene was the degreasing agent, had come to the attention of their Division of Industrial Hygene. It is significant that most of the deaths in European literature were preceded by symptoms of narcosis, but these two cases had very little, if any, narcosis.

In England and Germany, where trichlorethylene degreasing has been employed much earlier than in this country, many deaths have been reported.[3] This may have been due to inferior degreasing equipment. On the other hand, the workmen's compensation system in England and Germany has been more efficient than that in this country.

It has always been a matter of wonder to us that, with so much industrial medical research being conducted and with solvent degreasing a major industrial process, toxicological studies have not been undertaken on degreasing solvents. The only medical research study on these solvents, and which was previously referred to, was conducted by Carpenter[4] at the University of Pennsylvania and reported in 1937. This work was done on perchlorethylene, which is used today in only one type of degreasing unit and is sold for this unit, under the trade name of phillsolv. This investigation by no means clarified the toxicity of perchlorethylene. It stated that 50 parts per million produced a definite odor and concluded that a concentration somewhere between 100-500 p.p.m. is considered safe for daily exposures not in excess of 40 hours per week. This range of 100-500 p.p.m. is in need of extensive study.

Many of the states have accepted 200 p.p.m. (parts per million parts of air) as the maximum safe concentration for continuous exposure to trichlorethylene or perchlorethylene. This limit has not been based upon toxicological data from field investigations or on the results of practical or economical ventilation measures. It is primarily based upon the opinions of European industrial medical authorities. It is not clear whether this safe limit is based upon the maxmum concentration that will prevent acute poisoning or whether the strong narcotic effect of these solvents has been considered. It is claimed that both solvents have marked anesthetic properties, and we know that trichlorethylene recently has been proposed for use in anesthesia. We have found complaints of headache, nausea, and dizziness quite common among degreaser operators when atmospheric solvent vapor concentrations were well within the generally accepted toxic limit. It does appear to us that a worker complaining of these upsets presents a physiological manifestation as truly occupational as those which might arise from an exposure to a higher concentration. It does seem, therefore, that safe maximum concentrations, or what are known as toxic limits, should be based upon this premise, particularly when such lower concentrations are easily attainable by practical and economical engineering measures and operating procedures. We, therefore, feel that in the case of trichlorethylene and perchlorethylene, the safe maximum concentration for continuous exposure is too high. Since atmospheric solvent exposures of 100 p.p.m. at machine degreasing operations with the condensing type of unit can be easily obtained by good machine operation and location, with or without local exhaust ventilation, and since exposures much in excess of this figure elicit frequent complaints among degreaser operators, it is felt that the toxic limit should be set at a concentration considerably below the 200 p.p.m. limit in order that due respect be given to the anesthetic properties of these solvents.

Little clinical information is available in this country or in European medical experience to indicate the preference of trichlorethylene over perchlorethylene, or vice versa. Both are reported to have considerable narcotic action.

Sampling and Chemical Procedures

IN ANY study of atmospheric contamination, the device for obtaining the air samples and the chemical analytic methods play no small part. In the past 10 years, a good deal has been accomplished in the field of micro-chemical methods and procedures.

Methods for determining atmospheric solvent concentrations have, in the past, depended upon the interferometer or the Willson apparatus. The interferometer lacks most of the essentials of a good field instrument and has an accuracy of only ±20 p.p.m. The Willson apparatus, while a more efficient instrument, lacks good portability. Both instruments could not be easily moved about as the worker changed his positions, which must be done if an accurate measure of the worker's exposure is to be obtained. These instruments are, therefore, limited to measuring areal contamination which, although important, is not a measure of the worker's exposure. The average time spent in each area must be integrated if the average exposure, which is the desired result, is to be determined. This is automatically done with a portable instrument, for the worker can be followed about durng the sampling interval.

In this study, we were fortunate in the fact that our laboratory developed such an instrument[5] with supplementary analytic procedure. This instrument, shown in Fig. 1, which we call a micro-furnace, is somewhat similar in principle to the Willson apparatus, but is extremely portable. As a matter of interest, the Willson apparatus weighs approximately 23 pounds and our instrument weighs only 1.5 pounds. This instrument is based upon the fact that chlorinated hydrocarbon vapors, when passed over heated platinum and subsequently passed through a reducing medium, will produce an amount of HCl equivalent to the chlorine present in the chlorinated compound. If the absorption medium (sodium arsenite) is a liquid of definite volume and having a definite alkalinity, the amount of HCl obtained during sampling may be determined by

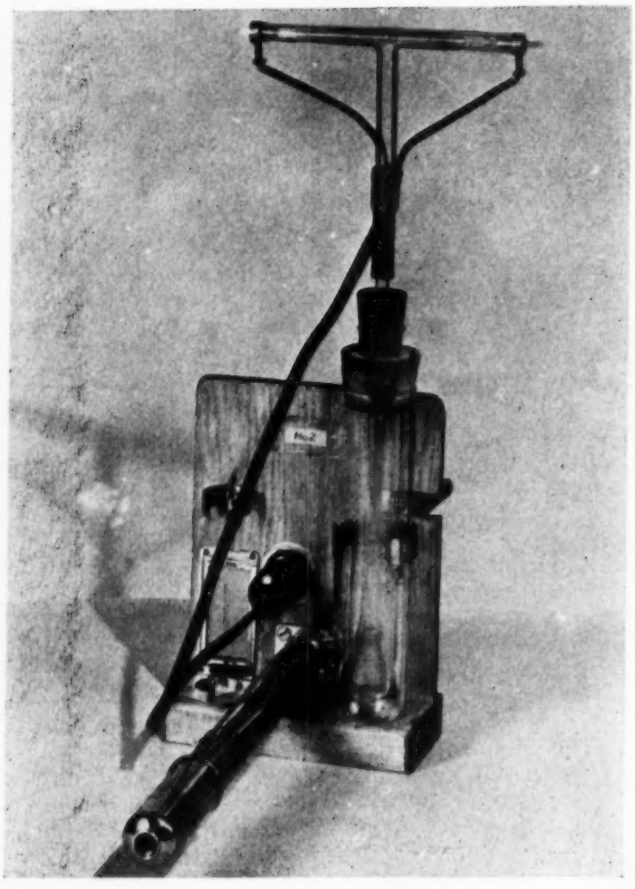

Fig. 1.

direct titration with HCl to a neutral point. This sampling and analytical method is accurate to within ±2%.

Degreasing Theory

THE most common degreasing equipment in its simplest form consists of a metal tank equipped with a heating element at the bottom for heating the solvent, and a water condenser of the jacket or coil type to condense the vapor. The solvent used in this type of degreaser is trichlorethylene. Recently a degreaser was placed upon the market which excluded the water jacket and relied upon a bimetallic thermostat for vapor control. This machine employs perchlorethylene. These machines may employ liquid solvent for immersion or for spray, since the simple vapor phase alone is limited to about 10% of the degreasing applications.

In vapor degreasing, the cold metal is slowly lowered into the vapor at which point the vapor will condense on the metal until the work is heated to the boiling point of the solvent. The solvent dissolves the oil and grease, and cleaning is accomplished by a washing effect. This washing effect greatly decreases as the temperature of the metal approaches that of the vapor, thus an advantage for the solvent with the higher boiling point. This vapor method has these disadvantages: it will only remove soluble material; on light gauge metal, the rapid heating prevents uniform condensation all over the work and results in oil runs and stains; and finally, irregular shaped work has a tendency to trap the oil and solvent, as well as to contain air pockets which exclude the vapors. To overcome these disadvantages, the immersion and spray type of degreaser were developed. These have the advantage of providing a mechanical cleaning, produced by the roll of the solvent over the surface of the work. The machines generally found contain two or more of these phases, i.e., vapor, immersion, spray. The usual sequence of operation is immersion into boiling solvent to remove heavy dirt and grease, immersion into cold solvent to rinse and cool the metal, and finally suspension in the vapor for a pure vapor rinse. When the spray is provided, the immersion phase is generally omitted.

It is claimed that degreasing machines are designed on a careful thermal balance between the heat supplied, to keep the solvent boiling as the work passes through the tank, and sufficient cooling in the condensing zone to maintain a definite maximum vapor level at all times, including the period of maximum heat input. In other words, the machine is designed to have a heat input great enough so that the vapor height will not rise and fall in the tank as the work is put in and taken out. There is no reason to doubt this claim. However, few machines are found which are operated under designed conditions, and, as the result, the vapor height does change and changes radically, in many cases, as work is introduced. This results in air entering the tank as the vapor height falls with the introduction of work, becomes contaminated with vapor and is expelled from the tank as the vapor height rises after the work is removed or while the work is in the tank.

Not only is it essential to maintain the thermal balance, but the dew point level is also important. The coolest point in the condensing zone should not fall below the dew point temperature of the room air in order to prevent the condensation of the moisture in the air. This moisture is detrimental to tank operation, for it lowers the boiling point of the solvent causing excessive solvent losses and increases the fusibility of the vapor.

Most of the degreasing machines in operation are manually operated, and it is in this condition that one of the chief causes can be found for high atmospheric solvent concentrations. Ideal control of solvent exposures rests upon divorcing all operating factors and control measures from the human factor. To this end, more can be accomplished by degreasing machine manufacturers than is at present provided. The wider use of thermostatic devices for controlling the heat balance (vapor height, solvent temperature and condenser water), and providing mechanical hoists as an integral part to all machines is a responsibility of the manufacturers to the safe use of their products. The great advantage to be gained by a mechanical hoist will be shown later in this paper.

Atmospheric Findings

THE average exposure during degreasing operations was obtained by 379 atmospheric samples at 108 machines which included the condensing type of machines, with and without local exhaust ventilation, and the non-condensing machine which had no local exhaust ventilation. These averages are shown in Table 2.

TABLE 2.
GENERAL AVERAGES

Type of Machine	Number of Machines	Number of Samples	Range of Atmospheric Findings (ppm)	General Average (ppm)
Condenser—Ventilated	39	149	5-393	96
Condenser—Non-ventilated	58	187	3-900	135
Non-Condenser	11	66	24-880	221

It can be seen that there is a marked difference in the average exposures at the ventilated and non-ventilated condensing type of degreaser. The ranges of atmospheric findings between both types are also much greater in the case of the non-ventilated machine. The

non-condenser type of degreaser, which type employs perchlorethylene, has the highest general average of the three groups. However, since only eleven of these machines were found in use, and only 66 atmospheric determinations were made, the statistical adequacy of the data for this type of degreaser can be questioned. Nevertheless, after viewing the operating principles of these machines, higher findings were expected. Solvent vapor was seen overflowing the top of the tank in one or two cases due to poor or impaired action of the vapor thermostat which is the only means of controlling the vapor height. This condition was not seen in the condensing type, although in a few cases the condensing jacket water was not circulating. It is felt that bimetallic thermostats are not quick enough in action to warrant their use as the sole means of vapor control.

TABLE 3.
RANGE OF ATMOSPHERIC CONCENTRATIONS

Range of Concentration (ppm)	All Tanks		Ventilated Tanks		Non-Ventilated Tanks		Non-Condensing Tanks	
	No.	%	No.	%	No.	%	No.	%
0— 50	109	27.1	69	46.9	29	15.4	11	16.9
51—100	97	24.2	29	19.7	58	30.8	10	15.1
101—150	68	16.9	15	10.2	47	24.8	6	9.0
151—200	36	9.0	10	6.8	17	8.9	9	13.8
201—300	59	14.7	20	13.6	25	13.2	14	21.2
301—400	19	4.7	4	2.8	7	3.8	8	12.1
401—500	5	1.3			2	1.0	3	4.5
501—600	3	0.7			1	0.5	2	3.0
601—700	2	0.5			0	—	2	3.0
701—800	1	0.2			1	0.5	0	—
801—900	3	0.7			2	1.1	1	1.4
Totals	402	100.0	147	100.0	189	100.0	66	100.0
%	100		36.6		47.0		16.4	

Table 3 indicates the distribution of atmospheric findings. It is important to note that 51.3% of all samples were 100 p.p.m. or less and that 77.2% of all samples were 200 p.p.m. or less. Interpreting the data by tank category, reveals that 66.6% of the samples at the ventilated condensing tanks; 46.2% at the non-ventilated condensing tank; and 32.0% at the non-condensing tanks were 100 p.p.m. or less. The percentages of samples 200 p.p.m. or less were 83.6%, 79.9% and 54.8% respectively. The importance of local exhaust ventilation in maintaining concentrations below 100 p.p.m., in the case of the condensing machines, is not impressive. Ventilation, as will be later shown, is not the cure-all for all operating sins.

Operating Factors

PROBABLY no single operating factor is more important in maintaining low solvent exposures than the speed at which the work is lowered into and removed out of the machine. It has been recommended by the equipment manufacturers that this speed be no greater than 12 feet per minute. Only 20% of the machines, and this included six automatic machines, were correctly operated. Table 4 reveals the percent of the total number of machines in each range of operating speed. Speeds as high as 120 feet per minute were found.

Degreaser operators generally lower the work into the machine at a much faster rate than they withdraw it. This resulted, in several instances, in the non-condensing machines, in causing the vapor to overflow the top of the tank. Supervisory personnel is extremely lax in impressing the importance of operating speed upon operators or in enforcing good operating rates. One place for making up lost production time due to breakdowns, etc., is generally the degreasing operation. Thus the need for divorcing machine operating from the human factor as far as possible.

TABLE 4.
TANK OPERATING SPEEDS

Speed Range	Percent of Machines in Each Speed Range		
	In	Out	Average
10—12	20.1	35.6	20.0
13—20	12.2	24.4	18.9
21—40	26.6	24.4	28.8
41—60	14.4	3.3	15.5
61—80	6.6	3.3	10.0
81—100	15.6	4.5	4.4
Over 100	4.5	4.5	2.3

Table 5 is an attempt to correlate operating speeds and solvent exposures. There is some error in the determination of operating speeds due to the fact that the start and stop points had to be noted and then measured. However, it is not felt that this is a great error. The interesting finding in this table is that, in the non-ventilated condensing machines, an operating speed of 40 f.p.m.; and in the case of the ventilated condensing machines, an operating speed of 80 f.p.m. was obtained before the solvent exposure appreciably exceeded 100 p.p.m. It would be interesting to see the results of other studies of this factor. However, despite atmospheric findings, the greater the operating speed the greater the solvent loss. The fact that most of these machines were in large rooms with good general ventilation due to warm weather conditions, is believed to be a major factor in maintaining low atmospheric findings, for it supplied a large dilution factor. The findings at the perchlorethylene, or non-condensing tanks, appears to indicate an advantage of the condenser as an additional vapor control measure, although as previously mentioned, the statistical adequacy of the data at these tanks can be questioned.

If these results can be substantiated by additional studies, it does not follow that the machines should be operated at much higher rates. However, it is felt that an operating rate probably in excess of 12 f.p.m., as recommended, can be economically and safely set. It is felt that a rate at least as high as 20 f.p.m., for some work can be safely used. Work removed from the machines much faster than the manufacturers recommendation will be partially wet. This implies excessive solvent loss and cost.

The great advantage of the enclosed automatic ma-

TABLE 5.
EFFECT OF OPERATING SPEED AS TO ATMOSPHERIC CONCENTRATIONS

Average Operating Speed — FPM —	Atmospheric Vapor Concentration — PPM —		
	Non-ventilated Tanks	Ventilated Tanks	P C L Tanks
10—20	92	71	—
21—40	96	108	129
41—60	137	90	174
61—80	176	62	310
81—100	202	175	254
100—150	248	—	295

chine can be partially indicated by the findings at the six machines included in this study. The average solvent exposure at these machines was 84 p.p.m.

The data in Tables 4 and 5 demonstrate the necessity and advantage of a controlled operating speed. It is felt that this is the greatest single requirement of present degreasing machines. It appears that equipment manufacturers by selling all machines with mechanical hoists with a limited speed range, would be contributing much to the safety of degreasing and the economy of operation.

Poor Operating Factors

THERE are certain precautions that should be taken for the safe and economical operation of degreasers. By discussing the abuses of these precautions, the proper measures will be indicated. One of the major abuses found was not keeping the work in the vapor zone until condensation stops. This resulted in the removal of the work wet and often dripping, which contributed much to the atmospheric vapor concentrations. This condition is aided by overloading the machine and disrupting the heat balance. As a consequence, it requires a long time before condensation stops and the impatient worker, possibly driven by a foreman, withdraws the work dripping wet. Condensation must stop, and the work withdrawn slowly if it is to be removed fairly dry. However, workers can not be expected to move heavy baskets of work slowly through the vapor zone.

Another major abuse in operating technic was the improper arrangement of irregular shaped work in the work basket. This results in improper drainage of the condensed solvent and again the removal of wet work. Irregular shaped parts must be carefully laid in the basket to allow good drainage. If drainage is still difficult, keeping the work in the vapor after condensing has ceased may allow boiling off the retained solvent. It was also found that where draining could not be satisfactorily accomplished in the vapor zone, the solvent was not carefully drained by tilting the basket or work on the top of the tank. Impatience again resulted in removing dripping work.

One case was seen where, in order not to mar a highly polished surface, cloth rags were wrapped around the prongs of the hook used in moving the work through the tank. The result was that the rags became wetted each time when striking the vapor and as the hook was removed from the tank, the solvent readily evaporated from the rags.

Still another poor practice was that practically no positive control of the condenser water was found. Very few tanks even had a thermometer in the outlet pipe. This was the general finding despite the fact that the condenser plays a major role in the heat balance of the machine. The usual control was entirely manual operation of a hand valve in the water line. Conditions were seen where the water in the condenser was not circulating at all. One equipment manufacturer[6] recommends that the condenser must always be supplied with cool water sufficient to prevent its exit temperature from rising above approximately 110°F. A study conducted in New York[7] recommended a water inlet temperature of 70°F, and 90°F at the outlet. It would, therefore, appear that since the cooling effect of the condenser plays such an important role in the design of the machine, this role should be thermostatically controlled or at least all condensing type degreasers should have thermometers in its water inlet and outlet lines. Without sufficient control, the freeboard distance will be seriously altered and the danger of vapor flowing over the top of the tank becomes quite possible. The freeboard distance, which is that distance from the top of the tank to the top of the vapor zone, should be, at a minimum, 0.6 the width of the tank.

It is quite evident that all poor operating procedures lead to excessive solvent loss and cost. This fact alone should be of great interest to management. It was also evident in this study that degreasing tanks can not be operated by an impatient, inexperienced and not too bright worker. That such workers are found at degreasing tanks is entirely the fault of management. Generally degreasing is viewed as unskilled work to which anyone can be assigned. However, on the contrary, the work is skilled. The assignment of a careful and well trained man to degreasing, at a higher wage scale than that for unskilled work, would be economically wise, for the saving in solvent alone would pay for the increased rate.

Effect of Movement through Vapor

IT IS NOT generally understood that the exposure of the degreaser operator varies with the movement of work through the solvent vapor, for all but the enclosed automatic machines. The more continuous this movement, the more static the exposure becomes. The minimum exposure should occur when the tank is hot and no work is passing through the machine. In all types of machines a very sharp reduction in atmospheric solvent was found when the work was not moving through the vapor zone. This reduction was, in most cases, in excess of 30% for the ventilated condensing machines, about 50% for the non-ventilated condensing machine, and about 50% for the non-condensing or perchlorethylene machines. However, no comparison between the various types can be made, for the higher the exposure, the greater the reduction to be expected. Furthermore, speed of operation is a function of atmospheric contamination, and both the ventilated and non-condensing machines had high operating rates. The important point is that a great reduction in exposure occurs, which indicates the benefit of the dilution factor achieved in large normally ventilated rooms.

TABLE 6.
ATMOSPHERIC VAPOR CONCENTRATIONS AT HOT NON-OPERATING TANKS

Type	Ventilation	Ave. Vapor Concentration at Machine
		ppm
Condensing	Yes	33
Condensing	No	76
Non-Condensing	No	125

Table 6 reveals the results of a series of samples at hot machines, which had not been operated for several minutes or the heat had been turned on prior to operating. Air samples taken at distances from the tanks were rarely in excess of 25 p.p.m. at a distance of 5 feet when sharp air currents did not pass over the tanks and the rooms had good general ventilation.

Solvent Loss

SOLVENT consumption is determined by type and size of work and exposed surface area. The general opinion regarding solvent loss is that it should not exceed 0.20 gals per hour of operation or 2.5 gals. per sq. ft. of tank area per hundred hours of operation. These may be satisfactory indices of economical tank operation. However, it is not felt that solvent loss can be used as a practical index of solvent exposure for several variables, such as room size, room ventilation and tank ventilation, tend to compensate for excessive solvent loss. This is not intended to mar the importance

of solvent loss as a measure of economical tank operation, but rather to emphasize the importance of atmospheric sampling in the measurement of solvent exposure.

In this study, no accurate data could be secured on solvent losses. No plant kept records of the exact hours of tank operation or of the solvent consumed in a definite period of time. Very few tanks were operated continuously throughout the day and no plant had given much attention to economics of solvent loss. Therefore, it was necessary to secure rough estimates of foremen and other personnel. Analysis of this data revealed the average solvent losses shown in Table 7.

TABLE 7.
SOLVENT LOSS

Type of Tank	Solvent Loss	
	Gals./100 hr./sq.ft.	Gals./hr.
Ventilated Tanks	4.9	0.37
Non-Ventilated Tanks	4.2	0.37
P C L Tanks	6.0	0.40

In general, the ventilated tanks had slightly greater solvent losses than the non-ventilated condensing tanks, and the perchlorethylene machines had the greatest. All average losses exceeded the accepted indices of economical operation. This was expected because of the exceedingly poor operating practices which were generally found. The excess of solvent loss of the ventilated condensing tanks over the non-ventilated condensing tanks was also expected, since ventilation does remove some solvent vapor from the tank. Witheridge and Walworth[8] found in their work that slot ventilation increased the solvent losses 0.3 gals. per sq.ft. of tank area per 100 hours of operation when their tank was operated 20% of the time, and 1.2 gals. when operated full time.

The range of solvent losses on the basis of gallons per sq.ft. of tank area per 100 hours of operation was from 0.7 to 18.0 for the ventilated condensing tanks with a median value of 4.9 gallons. In the New York study previously mentioned, the losses for ventilated condensing tanks ranged from 0.3 to 15.0 gals. per sq.ft. of tank area per 100 hours of operation, with a median value of 3.5 gallons. No correlation could be found between our solvent loss data and the atmospheric vapor concentration.

Cleaning of Tanks

THE frequency of tank cleaning depended upon the type of work and hours of operation. In general, the tanks were cleaned weekly. Despite the fact that a very high exposure occurs in the cleaning operation, many tanks were found where no respiratory protective device was worn while doing this work. The greatest complaints came from men who had to do this work. In one war plant, a service engineer from one of the tank manufacturers was employed to maintain two large, automatic tanks. However, even this individual did not wear any respirator. A cartridge type respirator, or better still, an air line respirator, should be worn when cleaning out the tank. If a cartridge type of respirator is used, a new cartridge should be employed for each cleaning and care should be exercised to insure that the respirator is of the type used for adsorbing organic solvent vapors.

Location of Degreasers

THE importance of proper location of degreasing machines with respect to excessive air currents and good room ventilation can not be stressed too much.

TABLE 8.
LOCATION OF MACHINES BY ROOM SIZE (CAPACITY)

Room Size (Cubic Feet)	Number of Machines	% of Total
1—10,000	10	9.2
10—25,000	12	11.1
25—50,000	19	17.7
50—100,000	12	11.1
Over 100,000	55	50.9
	108	100.0

Certain precautions of machine operation and location must be adhered to, if safe and economical operation is to be attained.

In this investigation, the importance of placing degreasing machines in large rooms in order to obtain a good dilution factor was better understood than any other single good practice. Table 8 reveals that only 9.2% of the machines were located in rooms under 10,000 cubic feet in capacity and that 50.9% of the machines were in rooms of over 100,000 cubic feet.

No machines or other appurtenances were found to be located in pits or in a confined space with little air movement. Such conditions are poor and favor high solvent exposures.

Great care should be exercised to locate degreasing machines in areas free from excessive air currents. Such excessive air motion over the top of open tanks tends to drag the vapor out of the tank and contaminate the general room air. In several plants, this condition was the cause of complaints of workers 20-30 feet from the tank. Since these workers were not previously exposed to solvent vapor, their sense of smell detected very low concentrations which, although less than 50 p.p.m., were nevertheless obnoxious to them. Such excessive air currents may be produced by unit heaters, open windows, spray booths or hoods with high ventilation rates. Some of the greatest faults found were locating machines near open windows or doors through which a high ventilation rate was found, and locating degreasers under unit heaters or air inlets which did not properly diffuse the air.

Table 9 reveals the solvent exposures at some machines over which excessive air currents were found. The necessity of preventing excessive air motion over degreasing tanks is quite clear. It appeared that lateral air currents in excess of 75 f.p.m. were detrimental.

TABLE 9.
EFFECT OF AIR MOTION

Tank Number	Lateral Air Movement over Tank (fpm)	Tank Vent.	Average Atmospheric Concentration (ppm)
1	150—200	N V	182
2	125—170	N V	433
3	205	N V	260
4	155—210	V	156
5	105—125	N V	144
6	175—250	N V	225
7	110—200	N V	291
8	50—150	V	103
9	100—200	N V	351
10	100—140	N V	140
11	400—1000	N V	406
12	150—200	N V	207

Control Devices

SINCE degreasing units have a carefully designed heat balance, the necessity for controlling or regulating this balance is obvious. Tanks are generally found in use free from any thermostatic control for either the vapor height or condensing zone. Of the 108 machines in this investigation, only 39 machines (36.1%) had vapor thermostats and only 14 machines (13%) had thermostats in the boiling solvent. In no machine was any control of the condenser water seen, except manual control by regulating a hand valve. This control was decidedly inadequate.

A thermostat is necessary to prevent overheating and too rapid boiling off of the liquid solvent, thereby producing vapor more rapidly than it can be condensed. In addition, a vapor thermostat is necessary to control the vapor height in case of failure of other controls. At least a thermometer is necessary in the condenser inlet and outlet lines to insure the maintenance of proper condensing water temperatures.

Tank Ventilation

THE problem of whether or not degreasing tanks should be ventilated is one of mild controversy. It is felt that tanks carefully operated and well located will reveal solvent exposures well within 150 p.p.m. and even as low as 100 p.p.m. Such findings are well within the toxic limit, if accepted at 200 p.p.m. However, at concentrations of 100 p.p.m., some men will complain of headache, nausea and dizziness. For such individuals ventilation is necessary. In addition, very irregular shaped work may require ventilation, since vapor or solvent retention may be very difficult to entirely eliminate in a reasonable time. Tanks in small spaces, with little general ventilation, may likewise require tank ventilation. However, ventilation cannot be viewed as a compensator for poor operation and poor location. Despite ventilation, solvent exposures above 200 p.p.m. were found in this study.

It has been recommended in the New York study previously mentioned[7] that where exhaust ventilation is necessary, it should be supplied at a rate of 60 c.f.m. per foot of tank perimeter through a 1½ inch horizontal slot. The recommended slot velocity was 500 f.p.m. Witheridge and Walworth,[8] however, found that a ventilation rate of approximately 30 c.f.m. per square foot of tank area with a slot velocity of approximately 350 f.p.m. was sufficient to reduce the solvent exposure in the operator's breathing zone from 400 p.p.m. to 100 p.p.m. In this study, 32 tanks (30.0%) were ventilated and only eight of these tanks had a ventilation rate equal to or greater than 60 c.f.m. per foot of tank perimeter. The average ventilation rate was 40 c.f.m. per foot of tank perimeter. The average exposure of these eight tanks was 105 p.p.m. against a general average for all ventilated tanks of 96 p.p.m. The most common hood arrangement was one-inch horizontal slots extending along the long sides of the tank.

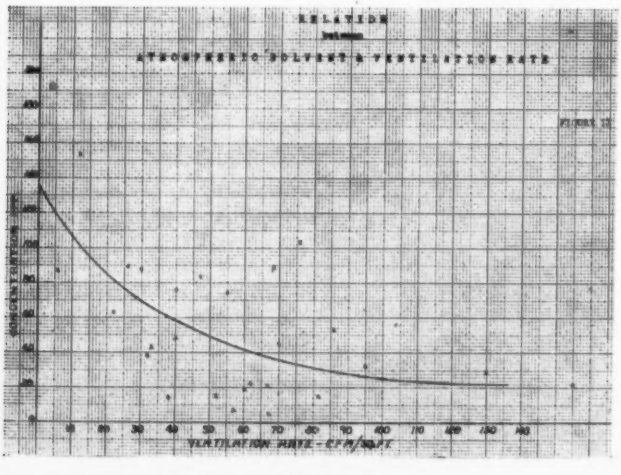

Fig. 2.

We have felt that the ventilation standards at all tanks should be based upon tank area. Therefore, an attempt was made to correlate solvent exposures against such ventilation rates found at the tanks. Fig. 2 reveals the result of this correlation. It is interesting to note that 30 c.f.m. per square foot of tank area was found, on the average, to be sufficient to produce an average solvent exposure of approximately 70 p.p.m., and approximately 15 c.f.m. per square foot of tank area was sufficient to provide an average exposure of 100 p.p.m. We, therefore, conclude that the accepted standard of 60 c.f.m. per foot of tank perimeter is excessive. It is hoped that additional field and research investigations will be undertaken, by others, to substantiate our findings or to determine this required ventilation rate, and to determine the solvent losses which are added by this rate. It must be remembered that only about 25% of these ventilated tanks were operated under 15 feet per minute and 52% were operated in excess of 25 feet per minute. Therefore, it is felt, that where the operating rate is controlled by a hoist and the tank is well located, a ventilation rate of about 30-40 c.f.m. per square foot of tank area would be sufficient to maintain the solvent exposure of the operator below 100 p.p.m. when ventilation is necessary on the condensing type of machine. Ventilation requirements for the non-condensing machines would probably be greater.

In conclusion, it is felt that ventilation at degreasing tanks is not necessary to maintain an average exposure of 100 p.p.m., if certain precautions of machine operation and location are followed.

These precautions are as follows:

1. Locate machines in rooms as large as possible with good general ventilation but free of sharp air currents over top of tank.
2. Maintain a minimum evaporative area exposed to air.
3. Maintain a minimum freeboard distance of 0.6 the width of the tank.
4. Maintain the heat balance carefully with every change in type and weight of metal.
5. Stack work properly in basket and tank so not to displace vapor in putting work in tank.
6. Prevent dead air space in work.

There is no question of the value of ventilation as a compensator for some poor operating practices. This is demonstrated in Table 10. However, if safe and economical operation is to be secured, ventilation is not the cure-all. Particularly is this important today with present difficulties in securing ventilation equipment. The interest of industrial hygiene is not advanced by controlling a poorly operated process by ventilation, and allowing the continuance of the poor practices that were responsible for the hazardous environmental condition.

TABLE 10.
EFFECT OF VENTILATION

Tank No.	Operating Speed	Atmospheric Solvent Concentration (ppm)	
		Fan On	Fan Off
1	100	76	229
2	20	23	261
3	64	21	119
4	72	61	192
5	48	54	120
6	45	36	335

Summary and Recommendations

THIS investigation consisted of a study of 108 degreasing units of the condensing and non-condensing types, and included 433 atmospheric solvent determinations by means of a new extremely portable micro-furnace. The general average concentrations found, were 96 p.p.m. for the ventilated tank of the condensing type; 135 p.p.m. for the non-ventilated condensing tank, and 221 p.p.m. for the non-ventilated, non-condensing units. Tanks employing both trichloethylene and perchloethylene were included in this study. The importance of maintaining certain operating precautions and good tank location was shown. The greatest detrimental poor operating practice was the excessive operating speed in manually operated tanks. Only 20% of the machines were correctly operated.

It was concluded from this study that tank ventilation is not generally necessary if tanks are carefully operated and well located. However, in some cases ventilation may be necessary, but in these cases it is felt that 30-40 c.f.m. per sq. ft. of tank area are sufficient when provided through two one-inch horizontal slots along the long sides of the tank.

The following recommendations are made as a result of this investigation:

Tank Design

THAT manufacturers of degreasing tanks market these machines equipped with mechanical hoists set at a maximum speed of 20 feet per minute.

2. That tanks be marketed equipped with thermostatic control of the heating and condensing zones, and also that they be equipped with thermostats to control the vapor height and solvent temperature.

Operation and Location

CARE should be exercised to insure complete condensing of vapor on the work before withdrawing.

2. Work should preferably be withdrawn at a rate of 12 f.p.m. or less, but at no time greater than 20 f.p.m.

3. Satisfactory draining of condensed solvent should be allowed before complete removal from tank.

4. The importance of a proper basket or holding device will eliminate much solvent dragout. The basket should be carefully designed to fit the particular type of work.

5. Tanks should be located in as large a space as possible and free from air motion across the top of the tank in excess of 75 f.p.m.

6. Maintain a minimum evaporative area exposed to air.

7. Maintain a minimum freeboard distance of 0.6 the width of the tank.

8. Maintain the heat balance carefully with every change in type and weight of metal.

9. Stack work properly in basket and tank so not to displace vapor in putting work in tank.

10. Prevent dead air spaces in work.

Ventilation

WHERE ventilation is necessary for irregular shaped work, it should be provided at the rate of 30-40 c.f.m. per square foot of tank area through two one-inch horizontal slots extended along the far and leading edges of the tank.

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Lead Hazard

—Occurring During Repair of a Burned Ship—

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RECENTLY there occurred a severe fire on board a large troop transport, and, during the repair, the workmen complained that they were exposed to a considerable amount of irritating dust.

Investigation showed that, as a result of the fire, there was considerable debris lying around in the ship compartments which had to be removed. This debris consisted of:

1. Layers of fiberglas insulation, part of which was still on the partitions and was being ripped down and part of which had been torn down incident to fighting the fire.

2. Ash from the combustion of furniture, hangings, paint, wire, insulation, woodwork, plumbing fixtures, etc.

3. Miscellaneous metal scrap.

This debris was shoveled into piles, loaded into wheelbarrows, carried to dumping platforms inside the ship and thence dumped and shoveled out through port holes. The port holes were connected with chutes and the debris thus dumped on the dock. The location of the ship was such that it was unprotected from the wind and frequent gusts of wind blew debris dust back through the port holes into the ship and swirled it around inside the compartments.

Dust samples of the air were taken with the Greenburg-Smith impinger at the rate of one cubic foot per minute and the particles counted in a Neubauer-Bright Line counting chamber. These samples were taken at the following locations:

1. At the edge of the former dining room midway between the shoveling and dumping operations where the air was relatively quiet and not markedly affected by gusts of wind.

2. At the site where the debris was scraped together into piles and then shoveled into wheelbarrows.

3. On the dumping platform adjacent to the portholes connected to chutes.

All these samples were taken inside the ship on the port side of "C" deck, frames 108 and 128 and in an area where a considerable number of men were working.

The table gives the results of the dust sampling:

Description of sample	Time of sampling	Vol. of air sampled	Million particles per cu. ft. of air
Quiet air	15 min.	15 cu. ft.	4.2
Shoveling operation	15 min.	15 cu. ft.	14.9
Dumping operation	5 min.	5 cu. ft.	70.0

At this stage of the investigation we recommended that the workmen exposed to this dust wear respirators affording protection against pneumoconiosis-producing

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and nuisance dusts. However, it occurred to us that the intense heat and reactions during and after the fire upon such materials as paint, cables, pipes, plumbing, etc., might have produced dust with a high lead content.

Preliminary lead analyses demonstrated the following:

1. Paint scales were strongly positive for lead using the microscopic technique of Chamot and Mason with the formation of crystals of lead nitrate and lead iodide as the criteria.

2. Debris samples from wheelbarrow loads and the dumping platform were strongly positive for lead using the same technique.

3. Quantitative tests on these same debris samples were done with Fairhall's chromate method and found to contain 9% lead. The moisture content of this debris was 2% and being so small it was disregarded.

However it remained to be shown how much of this lead in the debris dust was suspended in the air, thereby exposing the workmen to a lead hazard. For even though lead might be found in debris dust samples taken from wheelbarrow loads, dumping platforms, etc., it was necessary to determine if such lead particles were sufficiently small to remain suspended in air for a considerable period of time.

Therefore we suspended our original debris samples in a dust chamber and made dust counts and lead analyses of these suspended particles. With the stirring fan running continuously to keep the dust cloud distributed uniformly throughout the dust chamber, a 20-min. dust sample was taken with the impinger. To determine further whether the lead particles settled out slowly or rapidly, a second dust sample was taken immediately after the first, for a period of 36 min. with the fan shut off. In each case the dust particles were counted and lead analyses run on these impinger samples using the diphenylthiocarbazone (dithizone) colorimetric technique. The lead content of the second set was slightly higher than the first set, indicating that the lead particles did not settle out more rapidly but remained suspended longer than the rest of the particles.

Sample	Time of Sampling	Millions of particles per cu. ft.	Micrograms of lead	mgm. lead per 10 cu. meters of air	mgm. lead/10 cu. meters/ million particles/ cu. ft. of air
No. 1 (fan on)	20 min.	49.0	864	15.3	0.31
No. 2 (fan off)	36 min.	8.7	420	4.12	0.47

These lead concentrations were sufficiently close so that an average figure of 0.4 was used and applied to the original dust concentrations obtained on board the transport to determine the lead concentrations to which the workmen were exposed.

Description of sample	Millions of dust particles per cu. ft. air	mgm. lead/ 10 cu. meters/ million particles/ cu. ft.	mgm. lead/ 10 cu. meters of air breathed by workmen
Quiet air	4.2	0.4	1.68
Shovelling operation	14.9	0.4	5.96
Dumping operation	70.0	0.4	28.00

Summary and Recommendations

THESE concentrations are all above the threshold of 1.5 mgm. of lead per cu. meters of air. It is obvious that under these conditions respirators which afford protection against toxic dusts should be used. Accordingly respirators approved for pneumoconiosis-producing and toxic dusts were recommended.

Undoubtedly in the future there will be repairs made to other burned ships. In such cases where facilities are not available for making lead analyses on the dust, it is recommended that the workmen be equipped with the previously mentioned respirators.

This work is being presented in the hope of protecting future workmen against the dangers of lead poisoning, during repair work on board a burned ship.

Acknowledgment is made to CAPTAIN H. E. JENKINS, Medical Officer, Boston Navy Yard, for his cooperation and for affording us the opportunity to pursue this investigation, and to the Liberty Mutual Insurance Company for allowing us the privilege of using their dust chamber.

Effects of War

—On the Scope of Industrial Hygiene—

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SUFFICIENT has been said heretofore of the importance of industrial hygiene in the war effort. It is needless to restate that the "war will be won or lost in the industrial plants of America" and similar familiar slogans. We are in agreement that industrial hygiene contributes freely to the war effort; thus it behooves us as Governmental Industrial Hygienists to supply rapidly the effective tools for health maintenance of the industrial worker and his family.

I will refrain from discussing the augmented health problems confronting industry in war time, a familiar field to all here. Increased industrial hygiene problems, with limited trained personnel, further reduced by entrance of some into industry and others into the armed services, forces us to attempt an answer to this question, "How can we affect war production most favorably with limited personnel and equipment?"

The method of attacking lost time due to sickness and accidents in the State of Washington has caused some little comment. I present herein a limited picture of the industrial hygiene activities there, hoping that we may leave this meeting with the consensus of the conference as to how far a State Industrial Hygiene service should go in connection with general public health activities, without forgetting that industrial hygiene was originally concerned with the control of occupational diseases per se, but has in recent years been thought of in the more general terms of "adult hygiene."

The State of Washington, Department of Health, inaugurated industrial hygiene services in 1936. This activity was discontinued because of a chain of local circumstances which, it appeared, might jeopardize the effective operation of the entire department. The program was recently reactivated, because the State of Washington is now a critical war production area with over 200,000 workers building planes and ships, and another 300,000, and more, in other essential war production.

The new Division of Industrial Hygiene was created in October, 1942, about two and one-half months before the State Legislature convened. The Division was operating largely on the budget of the U. S. Public Health Service, which supplied a physician, engineer and chemist, in addition to essential field and laboratory equipment. Those nearest the local picture felt some state appropriation should be made by the 1943

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legislature. Consequently, activities differing from those usually carried on in a newly created division were inaugurated with the aim of selling industrial hygiene in a short time. However, by the time the legislature convened it was felt inadvisable to request appropriation because the educational program had not progressed sufficiently. The unusual procedure in starting this program resulted in overselling the general public health phases of industrial hygiene leaving little time for activity in environmental control.

Lack of understanding cooperation between the State Department of Health and another state department contributed to the early termination of industrial hygiene in Washington in 1936. Thus the first activity of the new Division was concerned with developing proper relationships between these two departments. A marked degree of coordination of effort has resulted, one indication of which is the fact that copies of all occupational disease reports to that department are now made available to the Department of Health; another, that all preventive phases of occupational diseases will possibly soon be placed in the Department of Health, although the other department is charged by law with compensation for occupational diseases, and has in the past made an effort toward their control.

Another early activity was the establishment of an Industrial Hygiene Advisory Committee to the State Department of Health. It seemed advisable for the purpose of speeding up the effective operation of the industrial hygiene program, to have a group of experienced and responsible men who might advise the Division with regard to its proposals and see that the policies agreed upon were properly presented to the groups they represented. The committee members were appointed by Governor Langlie, who presided at the first meeting, which was held in his office. He instructed the committee as to their duties and explained the need for industrial hygiene services in the State Department of Health in preference to some other state department. He pointed out that this made available to the industrial workers and their families all of the services of the state and local health departments. The membership of the committee includes two past presidents of the State Medical Society, two representatives of labor (one from the C. I. O. and the other from the A. F. L.), two representatives of management, and representatives of the two state departments, Labor and Industries, and Health.

This committee proved to be a keenly interested, working group who met frequently, at times with the Governor and/or other notables such as the Regional Director of the War Manpower Commission, when considering absenteeism reporting. A brief resume of some of the more important activities of the committee follows, stressing those problems which some among us feel are of secondary importance.

FIRST, was the establishment of policies to free the Department of Health from responsibility of adjudicating compensation claims or participating in such judication. (The lack of such understanding was one of the most important reasons for the failure of the industrial hygiene program in 1936.)

Second, a consideration of the advisability of using industrial hygiene as a vehicle to carry public health to workers in industry, instead of limiting the activities primarily to environmental sanitation. The committee's thinking was in line with our convictions, that with limited personnel and no field or laboratory equipment, the need to sell industrial hygiene to the people of Washington rapidly, called for emphasizing that environmental sanitation was but a part of the service which could be brought to the worker through industrial hygiene. It is my belief that industrial hygiene people can well do more about the non-occupational diseases which are responsible for 90% of the time lost due to illness and accidents, bearing in mind that the occupational diseases account for only 3%. The non-occupational disease problem was considered in committee from the standpoint of the responsibilities of labor and management toward recognizing and intelligently attacking the problems of lost time due to the venereal diseases, tuberculosis, faulty nutrition, poor dental health and similar problems. This activity is bearing fruit, as frequently requests for services arise from unexpected places where a committee member has directly or indirectly planted seeds which have already sprouted.

Third, the matter of sick absenteeism reporting which, of course, is closely tied up with the non-occupational disease problem. The advisability of the committee promoting absenteeism reporting within their respective groups has been seriously considered. Study was made of forms used by representative size and types of plants with the view toward recommending a uniform reporting system for all war industries. This activity has been temporarily tabled to consider the fourth and final activity to be discussed which, owing to local circumstances, seemed timely to consider, namely the promotion of interest among labor, management, and the medical profession for preplacement and periodic physical examinations of all essential war workers. I will mention only two reasons for stressing this problem: First, the fact that we are now at the bottom of the labor reservoir which emphasizes the need for putting one-armed men on one-armed jobs, and second, a situation peculiar to the west coast where the Metal Trades Council of the A. F. L. has in all of its labor contracts a clause prohibiting any and all types of physical examinations. This ruling affects all shipyard workers and those of other heavy metal industries of the area.

Permit me to state briefly the methods used by the committee to promote interest in this problem in labor, management, and medical groups. The opinion was that workers with certain physical defects now considered unemployable could be employed to good advantage if placed in a job they were physically fitted to do. Likewise the problem of injuring the health of workers now doing jobs for which they are physically unfit was considered. After thorough exploration by the labor representatives of the committee they reported their belief that the objection to physical examinations might be overcome if labor were given an opportunity to collaborate in planning the industrial health programs. Subsequently, the committee arranged to meet with the state representatives of the two major labor organizations to get their reactions to the problem, and more specifically, their objections. The committee agreed that if this group were willing to sponsor the program with certain reservations, the details would be discussed in a like meeting with representatives of management, and a plan agreeable to all developed after which the medical profession would be called in to assist with the final planning.

Labor's representatives on the committee selected the labor officials from their respective organizations to attend the meeting. Present at the meeting were the Governor, six representatives each of the C. I. O. and A. F. L., and all members of the Industrial Hygiene Advisory Committee. Although the attitude of labor's representatives was encouraging, the go-ahead signal was not sounded. After some delay, awaiting the report of the joint labor committee, the Industrial Hygiene Advisory Committee agreed that further education, particularly of labor, was needed. A statement of policy regarding physical examinations was then drawn up

for widespread distribution throughout the state. It included a recommendation for labor-management committees to consider the problem on an individual plant basis. There has been some activity following this action, although the time is too short to xpress an opinion on the effectiveness of this latter procedure.

Other activities that were carried on simultaneously consisted of the usual routine, such as establishing an office, laboratory, and library, and developing a program of policies and procedures. An educational program consisting of radio, articles for local publication, and talks (including a combined program on industrial hygiene and industrial surgery which was presented to the several medical societies in the more industrialized areas) has progressed rather well.

JUST as other divisions of the State Department of Health promote the application of their programs, in whole or in part, through the local health department, so does the Division of Industrial Hygiene promote such part of its program through the local health department as local units are prepared to handle effectively. Likewise the Division of Industrial Hygiene represents the health department in industrial hygiene as well as in the initial discussions with management, labor, and other groups in matters of health. I feel it essential at this point to express my personal feeling of the importance of making available all health services to the war worker. No longer should the health department use the school as the lone nucleus for promulgation of its activities. Industry also provides an opportunity for health workers to contact large groups of people. Certainly the program in the war plant should be emphasized even should such emphasis detract for the duration from the present importance attributed to school programs and other non-essential war health activities. One health program, for example, which is largely devoted to the school is nutrition. I see no great danger in letting the school nutrition program carry along on its own strength for the present, permitting the people who established this program to develop another for the worker who builds ships and planes.

Another example of how peacetime health services can be modified to meet the war emergency is illustrated by the following public health nursing experience in the State of Washington. In Vancouver, Washington, a critical war area, the local health department is heavily overloaded owing to a great influx of war workers in addition to some loss of personnel. Through cooperation between that health department and the medical department of a large shipbuilding corporation arrangements are now worked out for the health department to provide supervision and assistance to nurses employed by the company for the purpose of supplying nursing srvices, including public health nursing, to their employees and their employees' families. Such a program will of course call for some de-emphasis of non-industrial activities. This close tie up of the local health department and industry provides an opportunity for that health department to show what a local health department can do for industry and for an industrial community. If the venture is successful, I predict the trend will be for industry to help official health agencies and thereby assure their employees of wartime public health services. If the health department makes all of its servics available to industry, thus protecting the workers' health, I am convinced that public health, including industrial hygiene, will not experience a set back in the post-war period. If industrial hygiene is to be a part of a public health program, it must serve as a spear head and vehicle for bringing needed and acceptable public health services into industry. With only two or three people to serve over one-half million essential war workers, I believe their time can best be spent in getting the services of hundreds of health workers to the producer. Industry needs the services of the health department, and the public health movement needs the financial and moral backing of industry and labor.

It is no doubt needless for me to say that I am looking at this picture from the viewpoint of a public health administrator, and am attempting to look at industrial hygiene in a broader light than the highly technical phase. Thus I consider industrial hygiene as an agency that, in addition to supplying an important technical service, introduces management and labor to the other technical services of the health department. Feeling that the latter is an urgent and important function of the Industrial Hygiene Division, I am not too concerned with the mechanics of its application. Formerly, I felt this could best be done by first giving the industrial plant a specific industrial hygiene service, such as eliminating an occupational disease hazard. This has been found to sell management on the health department and open the door for the other services. I am convinced that we should at least be as concerned with the factors responsible for the 90% of lost time as with those responsible for the 3% of lost time. The 3% was formerly attacked chiefly as a means of getting the toe in the door. Currently, I am wondering if the method used in Washington may not give the same entry on a wider front, and in less time, than could be gained by direct individual plant services to a very limited number of plants.

Only when the effectively planned services of the public health physician, dentist, tuberculosis and V. D. control officers, nutritionists, nurses, and sanitary engineers are actually being given industry, can we affect the non-occupational disease problem. These services, modified to meet war time conditions, should be applied in a matter of months, if they are to be effective in helping to win the war. A long range conversion program taking many years is not the answer. It is the responsibility of industrial hygiene people to understand their peculiarly advantageous position which enables them to interpret community public health services to labor and management and to introduce these important services to that large segment of our population so essential to the war effort.

I believe the time spent in carrying the broader public health services to the plants and their workers pays dividends in many ways. Permit me to state examples of speedy results brought about by such activities.

As stated above, little funds were available for industrial hygiene services in Washington. When the need became apparent for an industrial hygiene advisory nurse, one of the most capable people in the Nursing Division of Public Health was selected. This nurse remains on the budget of the Division of Public Health Nursing, with everyone convinced that this is as it should be.

At the present time a concentrated sanitary survey of all essential war industry is being conducted by the Division of Public Health Engineering through contacts and introductory services of the Division of Industrial Hygiene which serves in a liaison capacity between the Division of Public Health Engineering and industry. In the early stages of this activity the personnel of the Industrial Hygiene Division are working with the Division of Public Health Engineering to effect the closest possible cooperation of divisions within the Department of Health.

A final example of the rapid results possible is the experience in a plant in another state engaged in the manufacture of electric insulation used in essential radio equipment. This plant employed over 1,000 people, several hundred of whom operated small bench

machines at which they were seated throughout the shift. Every operator was apparently an able bodied man or woman. Following the suggestion of the industrial hygiene personnel, the company soon decided to employ as many physically handicapped persons as could be obtained, to release a like number of normal workers for whole man jobs as the demands for their services arose. Such cooperation between industry and, in this case, the Crippled Childrens Service of the State Health Department who supplied the handicapped people (formerly non-employed) needs initial guidance by industrial hygiene people. This one activity made possible the use of several hundred handicapped persons. I am convinced that relatively few hours work in this case did more for the war effort, through supplying manpower, than could many a medical and engineering environmental study. If the aim of industrial hygiene is to "keep more men, at more machines, more days, to produce more war goods," the general public health aspects must be more strongly stressed by industrial hygienists.

Finally, in discussing the activities of the Washington program, we must not overlook that environmental studies have been conducted. We realize that this highly specialized service can be given only by the Industrial Hygiene Division and therefore must be carried on simultaneously with the essential public health education program. I will not burden you with the number and type of studies made to date but am frank to admit that we in Washington considered the environmental sanitation phase of the program in of secondary importance. Thus the only physician in the Division has been too much concerned with the general public health activities outlined above to devote a great deal of time to investigation of occupational disease reports, which average 165 a month, or to do plant medical industrial hygiene work, such as studying records, evaluating medical programs, and working in the plant with the engineer and chemist. This has necessitated leaving the environmental sanitation to the latter personnel.

I have discussed briefly the industrial hygiene activities in Washington and am aware that the program has been unbalanced. Part of this was intentional and part was the result of overselling the general public health phase of the program in the early stages and the necessity of keeping ahead of others who might trample us in their efforts to carry the ball we had handed them.

Certain accomplishments indicate that even though unbalanced, the program has been effective. Among the accomplishments are:

1. We have just concluded a 10-week course on Industrial Hygiene for nurses at the University of Washington and are committed to conduct, in cooperation with the University, a two-week intensified course in August.

2. The Chief of the Division has presented the subject to the leading medical societies of the state.

3. The State Director of Health and the Chief of the Industrial Hygiene Division spoke at an annual State-Labor Convention, having ridden in on the coat-tails of a member of the Industrial Hygiene Advisory Committee. This indicates the effectiveness of having labor representation on such a committee.

4. Through these educational activities a widespread interest in industrial hygiene has been aroused throughout the state. This interest has resulted in such a great number of requests from industry for assistance in engineering and medical problems, that it has been physically impossible for our limited staff to more than scratch the surface. Because of this demand for service, a 10-week course on Industrial Hygiene for nurses at the University of Washington and are committed to conduct, in cooperation with the University, a two-week intensified course in August.

5. The Governor, having been kept abreast of our activities as we went along, has recently made available sufficient monies from his Emergency Fund for expansion of the original staff and facilities to more than double, and advised that more would be made available if needed. In discussing the industrial hygiene expansion program in Washington, Governor Langlie said "We have a job to do—let's do it," and added his assurance that the people of the State of Washington would not question the expenditure of funds for this essential activity.

In conclusion permit me to restate a desire for this conference to consider further how far industrial hygiene programs with limited personnel and equipment should deviate from environmental sanitation. My personal views require no restatement except for this thought, that perhaps I have overemphasized the public health phase in order to arouse your thought and discussion.

The effect of war on the scope of industrial hygiene is to place a great responsibility on us as industrial hygiene workers. We must decide how, with existing industrial hygiene facilities, together with our state and local health departments, we can give the most effective service to keep manpower on the production front.

I quote Doctor Warren F. Draper, Assistant to the Surgeon General of the U. S. Public Health Service, who has said, "Perhaps the most far-reaching obligation of the U. S. Public Health Service is to coordinate the health-conservation activities of industry, labor, medicine and interested government agencies."

Discussion

W. E. DOYLE, M.D., (Director, Bureau of Industrial Hygiene, State Department of Health of Kentucky): DR. FARNER has presented an excellent paper on the effects of war on the scope of industrial hygiene, but I am afraid that he is over optimistic that we will leave this meeting with the consensus of the conference as to how far a state industrial hygiene service should go in connection with general public health activities while not forgetting that industrial hygiene originally concerned itself with the control of occupational diseases. I do not believe that any one-day conference of governmental industrial hygienists could formulate a consensus opinion on such a far reaching program of industrial hygiene activities.

There are 38 reasons why we do not all think alike in this connection. By this I mean the 38 individual state industrial hygiene bureaus, each with its geographical considerations, the policies governing the State Departments of Health or Labor under which these Bureaus are organized, the length of time these Bureaus have been functioning and the personnel available to the individual Bureau, as well as the more or less fixed opinions of each of the state directors. I believe that DR. FARNER has attacked the problem presented to him in the state of Washington with a great deal of enthusiasm, careful thought and administrative ability. He has quickly evaluated the needs of his state and has gone about solving the problems with energy and dispatch. As he has told us, the rebirth of the Division of Industrial Hygiene in Washington is very recent, inaugurated with little personnel and even less money, and yet he has had to serve and serve quickly some half million industrial workers in essential war production. He has intimated friction between certain state departments, which obviously had to be smoothed over before any program could be adopted for the advancement of industrial hygiene in his state. The fact that he has received such a degree of success in coordinating his departments in such a short time is a happy indication of the success with which his educational approach is being received.

Another signal success is that he has hope that the preventive phases of occupational diseases will be placed in the Department of Health where they belong.

He has listed for us some activities of his industrial hygiene advisory committee of the State Department of Health, which he says he feels that some of us may con-

sider to be of secondary importance. My personal opinion is that neither one or the other is primary and neither one or the other secondary—that all are of equal importance. To free the Department of Health of the responsibility of adjudicating compensation claims or to participate in litigation is to my mind absolutely essential. We, as industrial hygienists, are fact finders. We should be permitted to present our facts where they will do the most good. We should ride the middle of the road, leaning neither to one side nor the other. If we do this, and do it as a matter of policy, there is absolutely no doubt that we will win, and we will deserve, the faith and cooperation of both labor and management. He considers the advisability of using industrial hygiene as his vehicle to carry public health to workers in industry instead of limiting activities primarily to environmental sanitation. In my opinion, this is right also, particularly where there is limited personnel and but little field or laboratory equipment, but when these limitations are removed and as quickly as they are removed the study of environmental sanitation and immediate direct service to industry should begin. Industrial management wants it, labor wants it. They receive the evaluation that you make of their industrial environments gladly and, nowadays at any rate, they receive your recommendations for control with an open mind and an open purse, and there is no way in which you can make a better friend of industry than in helping them to solve their industrial health problems. I agree with DR. FARNER that industrial hygiene personnel can well occupy itself with non-occupational diseases which, as he says, are responsible for 90% of the time lost due to illness and accidents, and we should bear in mind that occupational diseases account for only 3%. However, there is a considerable amount of industrial ill health which cannot categorically be placed in either occupational or non-occupational diseases. I am referring to the higher morbidity rate among industrial workers than among those non-industrially employed. This we must attribute to the working environment, to the industrial health hazards which may not necessarily be occupational disease hazards. These I feel strongly should deserve our closest scrutiny and study. Among these I might mention fatigue, optimum hours of work, heat and humidity, noise and shock, and mental hygiene.

Medical absenteeism is a problem which is strictly left up to the industrial hygienists to aid in solving. Of course, this is more non-occupational than it is occupational. I have little hope that much can be done in solving the absenteeism problem during this war period. The migrant war worker, the itinerant worker, and the malingerer are playing havoc with the stabilization of labor. The recent War Manpower Stabilization program of the President is doing much to relieve this intolerable situation. The freezing of workers in their present occupation is preventing the tremendous labor turnover which has been a headache to all concerned with absenteeism reporting, recording or evaluating, as well as a headache to the physical examination section of the plant medical departments. In Kentucky we are working in close cooperation with the War Manpower Commission through its U. S. Employment Service. Any worker who presents himself to this bureau for release giving as a reason ill health resulting from occupational exposure is referred to our bureau where a history and physical examination is done and recommendations returned to the War Manpower Commission. In the six weeks that we have been doing this chore, and a chore I assure you it is, I would guess that less than 20% of of those examined have honest and logical reasons for being granted release and for seeking new employment.

DR. FARNER has a particularly difficult situation when a large union or group of unions has labor contracts with a prohibiting clause on all types of physical examinations. However, I am sure that he will overcome this difficulty through his very effective educational approach to labor, management and medical groups. Labor is not nearly as reluctant to study and understand public health as it was a few years ago. Not very long ago, all of the coal mines in Eastern Kentucky had such prohibitive clauses in their labor contracts. Very few of them have today and those are only the very small ones.

I agree with DR. FARNER that the State Health Departments should not use the school as a lone nucleus for public health activities. Certainly industry is just as important. perhaps more so, for obvious reasons. If the industrial worker, who is usually the head of the family, understands and practices public health he carries it to his home and to his children. As DR. FARNER has stated, we have always been concerned as to how to get the toe in the door of industry to open it for our service, whether to use the public health educational method or the immediate specific industrial hygiene service. I say let's get both toes in the door and give them both.

Symposium on Industrial Hygiene

—American Chemical Society, Division of Water, Sewage, and Sanitation Chemistry, Pittsburgh, September 6-10, 1943: Abstracts of Papers—

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DEVELOPMENT AND SCOPE OF INDUSTRIAL HYGIENE SERVICES—R. T. PAGE, State Relations Section, Division of Industrial Hygiene, National Institute of Health, Bethesda, Maryland.

This paper traces the development of industrial hygiene activities particularly in the United States, and outline the objectives and present trends of these activities.

The development of the industrial hygiene program in this country has followed critical events in the history of this Nation. It was initiated in World War I. The second upsurge resulted from the demand for social security as a consequence of the depression which began in 1929. Today its progress is being given further impetus by the war and by the realization that healthy, efficient workers are absolutely necessary for the production of the vital materials for war.

Besides the several agencies in the Federal government which are concerned with industrial hygiene there are industrial hygiene services in practically every industrial state in the Union. Today there are 47 industrial hygiene units in 38 states, one territory, and the T.V.A.

The physicians' studies of the health of workers and the engineers' evaluation of the working environment necessitate numerous laboratory examinations of a clinical, physical, and chemical nature. These call for highly trained chemists and biochemists. Today, with the added use of chemicals in many of our processes, there is a greater need for data concerning the toxic effects of these substances.

Cook

CHEMICAL CONTROL OF INDUSTRIAL HEALTH HAZARDS — WARREN A. COOK, Division of Industrial Hygiene and Engineering Research, Zurich Insurance Companies, Chicago.

The chemist should interest himself to a greater extent in industrial hygiene especially with reference to chemical phases of control of industrial health hazards. This paper outlines a procedure to guide the chemist in his introduction to this activity.

As the chemist is in a strategic position to know all the materials being employed and those contemplated for use in his plant, and since his training permits a ready comprehension of their relative toxicity, he is a logical person to maintain a list of materials used or produced, classified by department and degree of hazard. The purchasing agent should send him a copy of all new materials ordered and the production engineer should notify him of any change in operations which might alter the exposure of the workers to potentially hazardous materials.

In the chemical control of health hazards, the chemist should keep a record of the extent of all exposures. Some will be manifestly low, others obviously in need of control, but many are on the borderline where actual determinations are necessary to decide whether they are safe or hazardous. These exposures should be determined either by air analysis, by some indication of the amounts actually absorbed as through analysis of urine, or by a combination of both such methods. Examples are given of the relative value and role of these several types of methods for evaluation of exposures.

Reference is made to the availability of industrial hygiene services to assist the chemist in undertaking this work.

These findings should be interpreted by the chemist on the basis of toxicological data and referred with his interpretations to the plant manager and to the medical department. Where engineering control measures have been instituted, check determinations should be made to evaluate their efficacy.

Discussion is included concerning the value of routine quantitative data on the exposure to potential health hazards in the establishment of toxic limits based on actual industrial conditions. It is pointed out that the chemist should accept his part in the responsibility for good industrial hygiene and should undertake much of the actual work of chemical control of industrial health hazards.

Holden and Hemeon

THE HYGIENIC APPRAISAL OF SOLVENT VAPORS AND THEIR CONTROL BY VENTILATION—FRANCIS R. HOLDEN, and W. C. L. HEMEON, Industrial Hygiene Foundation, Pittsburgh.

One result of the spreading war industries has been the extension of the use of toxic solvents. The conversion of small peacetime factories to war production has produced widespread exposure to chemicals not previously handled. Industries which manufacture metal parts for war machines are using degreasing solvents, often for the first time. They are also introduced in paints, enamel, and lacquers, the majority of which are applied by spray guns. Rubber cements, some containing harmful solvents, also are used extensively. These are but a few of the exposures encountered.

Experience gathered over the years by our basic industries has made the safe control of solvent vapors readily possible. However, the specialized knowledge of the relative danger from benzol or butyl acetate, from toluol or carbon bisulfide, and the varying degrees of control necessary for their safe usage, are not always possessed by many of the new manufacturers of war equipment.

Chemists are likely to be easy prey to the fallacy in ventilation that vapors of solvents are heavier than air and therefore exhaust applied near the floor or at a low point is a panacea for control of noxious vapors. It is shown that the idea is false and the reasons therefor. For ventilation purposes, the specific gravity of a solvent vapor relative to air is not the ratio of its molecular weight to that of air, as is so commonly assumed.

Watrous

BENZOL POISONING—PROGRAM FOR ITS CONTROL IN LIGHT CHEMICAL PLANT—R. M. WATROUS, M.D., Abbott Laboratories, North Chicago, Illinois.

Benzol is an important industrial poison, especially in the light chemical industry, because of its wide use as a solvent, its unsuspected occurrence in many mixed solvents and other products of unstated composition, and the insidious nature of its toxic effect. Chronic poisoning may take place under conditions of exposure not generally recognized as dangerous, and the damage to the bone marrow may be irreversible, causing death. The "safe" upper limit in the workroom air was formerly considered as 100 to 50 p.p.m., but modern studies question whether any concentration is safe for certain sensitive persons.

Exposure to benzol may be measured by analysis of air samples or by testing the conjugated urinary sulfates in those exposed, but neither method indicates whether damage is being done to the workmen. The only way to detect early damage is by medical examination, and the most important feature of this is the periodic blood count. Some statistical considerations necessary for determining the "normal" blood count are discussed. Bearing normal variations in mind, it is possible to classify blood counts as "normal," "suspicious," or "seriously abnormal" in chemical workmen. An arbitrary standard for accomplishing this is presented.

Using this standard, periodic blood counts have been made for over three years in a light chemical industry where there is considerable exposure to benzol which cannot be eliminated. An average working force of 100 has thus been scrutinized. A method is described whereby all the blood counts of 100 or more men can be shown graphically on a single sheet, enabling the medical administrator to survey the entire benzol control problem at a glance. This method has satisfactorily detected several cases of incipient poisoning, prompting remedial measures which prevented any serious outcome.

Goldman

METHODS OF SAMPLING AND ANALYSIS OF AIR CONTAMINANTS IN THE WAR INDUSTRIES—F. H. GOLDMAN, National Institute of Health, Bethesda, Maryland.

The manufacture of munitions and other war materiel has given great impetus to industrial hygiene activities in an effort to control the health hazards of the industrial environment. Due to dangers from fire and explosion many of the usual methods of sampling have had to be discarded and new ones substituted.

The power-driven large impinger is replaced by the midget impinger. Various types of midget bubblers have been designed. Gases and vapors have been trapped in such bubblers by filling them with special reagents and liquids. These bubblers are usually operated at a rate of 1 to 3 liters per minute for 10 minutes. Nitro compounds such as tetryl and TNT, metal fumes, chlorinated hydrocarbons, and alkaline earth dusts have been sampled in this manner. The analytical procedures used for the determination of ammonium picrate, dinitrotoluene, tetryl, TNT, nitroglycerine, PETN, mercury fulminate, and chlorinated hydrocarbons are mentioned and described briefly.

New apparatus for collecting "grab" samples is described including special bottles for nitrogen oxides and benzol as well as a mercury seal flask for solvent vapors.

Special instruments such as the "mercury detector" and the "benzol indicator" are calibrated in terms of the various organic solvent vapors for which these instruments are also used.

The techniques of emission and absorption spectrography as well as polarography and x-ray diffraction photography have also been applied in this field.

Kehoe, Cholak, Largent

THE HYGIENIC SIGNIFICANCE OF THE CONTAMINATION OF WATER WITH CERTAIN MINERAL CONSTITUENTS—R. A. KEHOE, M.D., J. CHOLAK, and E. J. LARGENT, Kettering Laboratory of Applied Physiology, College of Medicine, University of Cincinnati, Cincinnati, Ohio.

The usual means and the extent of the contamination of drinking water with lead, zinc, copper, aluminum, tin, silver, manganese, and fluorine, as shown by the available information, are briefly discussed. The importance of the additional intake of these elements in foods and other beverages, in relation to the problem of safe concentrations in water, is pointed out. The physiological behavior of certain of the trace elements, with respect to their absorption, distribution, and fate in the human body is outlined, and some of the problems yet to be investigated are defined.

Lea

RAPID INDIRECT DETERMINATION OF ZINC BY THE DITHIZONE METHOD—WILLIAM L. LEA, Industrial Hygiene Division, Wisconsin State Board of Health, Madison, Wisconsin.

Zinc may be determined in the presence of lead by first determining the lead content of an aliquot of the sample by the usual dithizone technique. On a second aliquot the zinc and lead are simultaneously extracted as dithizone compounds by omitting the potassium cyanide from the aqueous extracting solution. The chloroform solutions of the extracted lead and zinc dithizone compounds are washed free of excess uncombined dithizone with a dilute ammonium hydroxide solution and subsequently decomposed by washing with a 1% by weight solution of hydrochloric acid. The chloroform layer containing the free dithizone obtained by the acid decomposition of the lead and zinc dithizone compounds is reconverted to lead dithizone by shaking with an aqueous solution of pH 9.0 containing excess lead. The chloroform solution of lead dithizone thus formed is drawn off and compared with lead standards. The lead content of the sample, as previously determined, is subtracted from the new lead content based upon both lead and zinc, the zinc being expressed or read as lead. The value obtained by difference between these two concentration values is divided by 3.17, the ratio of the atomic weights of lead and zinc, to obtain the zinc concentration of the sample being analyzed.

In making lead determinations by

visual color matching, it is customary to match the color of the lead dithizone compound obtained from an aliquot of the sample with standards prepared in a similar manner. Since the lead dithizone compound is not stable over long periods of time, it is necessary to prepare fresh standards for each set of samples. This time consuming disadvantage in visual color matching is overcome by the preparation of synthetic color standards which are stable over a long period of time.

American Industrial Hygiene Association
News of Local Sections

Metropolitan New York Section

A REVIEW of the Industrial Hygiene Symposium held by the Division of Water, Sewage and Sanitation Chemistry of the American Chemical Society at the Pittsburgh, Pennsylvania meeting on September 6, 1943, it being presented by F. A. Patty, L. Scheflan and M. B. Jacobs at the first meeting, on September 29, 1943.

Of much interest to members of the Section as well as other members of the Association throughout the country is a mimeographed description of some of the chemical methods employed in the Laboratory of the Division of Industrial Hygiene of the New York State Department of Labor. Dr. Leonard Greenburg, Executive Director, states that this manual which is essentially a reprint of a previous issue is available without charge to interested persons.

Chicago Section

THE first of eight meetings which are planned for the Chicago Section was held on September 30, 1943. Following the programs of previous years, a number of subjects or phases of a subject are being covered in a single evening in order to include the interests of the diversified membership of the Section. MR. JAMES R. ALLAN, International Harvester Corporation, and Member of the Advisory Committee to the Illinois Industrial Commission, is to discuss the Proposed Industrial Sanitation Code for the State of Illinois. This subject which will be open for an informal discussion by the members will be followed by a sound strip film entitled "Welders—To Your Health," recently released by the U. S. Maritime Commission and the U. S. Navy. LIEUTENANT KENNETH W. NELSON, USNR, who is in charge of industrial hygiene for the shipyards in the Great Lakes Area under the direction of PHILIP DRINKER, Chief Health Consultant of the U. S. Maritime Commission, is making this picture available and will also present the first scientific data developed on the factors of time and distance necessary to cause eye-flash from the welding arc. This research was conducted by DRINKER, Past President of the Association.

Michigan Section

THE Michigan Industrial Hygiene Society is to schedule a number of meetings during the coming year outside of Detroit in such cities as Grand Rapids, Lansing and Flint, so that there may be a more extensive participation in the activities of the Section.

A major contribution of the Michigan Society is the instigation of the "In-service Training Course in Industrial Hygiene for Plant Safety Personnel" which has been planned as the result of a request of the Society to the Dean of the School of Public Health, University of Michigan. Nine of the 10 members of the Planning Committee are members of the Society. The Program of the course which is being given October 19-21, 1943, by the University at Ann Arbor is as follows:

Tuesday, October 19

MR. H. G. DYKTOR—Course Leader, presiding:

"Orientation"—HENRY F. VAUGHAN, DR. P.H., Dean, School of Public Health, University of Michigan.

"The Significance of Industrial Hygiene"—C. D. SELBY, M.D., Medical Consultant, General Motors Corporation.

"The Relationship of the Safety Engineer to Industrial Hygiene"—O. F. LEHMAN, Safety Engineer, Chrysler Corporation.

"Environmental Aspects of Industrial Hygiene"—R. R. SAYERS, U. S. Public Health Service.

"Control of Solvent Vapors and Acid Mists"—W. G. FREDERICK, Sc.D., Chief Chemist, Bureau of Industrial Hygiene, Detroit Department of Health.

"Control of Smokes, Fumes, and Gases"—H. H. SCHRENK, PH.D., Chief Chemist, Health and Safety Division, U. S. Bureau of Mines.

"Evaluation and Control of Dust"—J. J. BLOOMFIELD, Senior Sanitary Engineer, Division of Industrial Hygiene, U. S. Public Health Service.

Colored Motion Picture and Discussion—Safe Operation of Solvent Degreasers, prepared especially for this school.

Study of Educational Exhibits—Supervised by Contributors.

Group Discussion Topics—MR. BLOOMFIELD, Discussion Leader.

1. Foundry and Forging Practices: moulding, core making, shake-out, cleaning, heat treating, etc.

2. Metal Finishing: machining, grinding, welding, plating, metal cleaning and painting, etc.

3. Plastics: formaldehyde resins, impregnation, curing, fabrication, etc.

Wednesday, October 20

MR. T. F. MOONEY—Course Leader, presiding:

"Industrial Ventilation Practices"—W. N. WITHERIDGE, Director, Bureau of Industrial Hygiene, Detroit Department of Health.

"Applications and Limitations of Respiratory Protective Equipment"—DR. SCHRENK.

"Personal Protective Clothing and Equipment"—J. A. PURDY, Director of Safety, Michigan Mutual Liability Company.

"Causative Agents of Industrial Dermatitis"—LOUIS SCHWARTZ, Medical Director, U. S. Public Health Service.

"Dermatitis Preventive Measures"—DR. SCHWARTZ.

"Modelling of Women's Protective Clothing."

Topic: Legal Interpretation of the Recent Modifications of the Michigan Workmen's Compensation Act. Presiding: JOHN W. GIBSON, under whose administration as Chairman, Michigan Department of Labor and Industry, this act was revised.

Speaker: L. J. CAREY, General Counsel, Michigan Mutual Liability Company.

Discussants: THEODORE RYAN, Counsel, Michigan Department of Labor and Industry; JOHN LOVETT, General Manager, Michigan Manufacturers Association.

Thursday, October 21

MR. W. N. WITHERIDGE—Course Leader, presiding:

"Plant Sanitation"—H. G. DYKTOR, Chief Engineer, Bureau of Industrial Hygiene, Michigan Department of Health.

"Maintenance and Its Relation to Safety and Health"—W. L. LOVETT, Safety Director, N. A. Woodworth Co.

"How to Make a Survey for Health Hazards"—A. C. FUNKE, Industrial Hygienist, Michigan Mutual Liability Co.

"How to Sell Industrial Hygiene to the Worker"—JOHN W. GIBSON.

"How to Utilize the Resources of Official and Private Industrial Hygiene Agencies"—K. E. MARKUSON, M.D., Director, Bureau of Industrial Hygiene, Michigan Department of Health.

Summarization—H. E. MILLER, Public Health Engineering Division, School of Public Health, University of Michigan.

The officers of the Michigan Section for the year 1943-44 are as follows:

President: H. G. DYKTOR,, Chief Engineer, Bureau of Industrial Hygiene, Michigan Department of Health, Lansing; President-Elect: A. L. BROOKS, M.D., Medical Director, Fisher Body Division, General Motors Corporation, Detroit; Past President: S. F. MEEK, M.D., Assistant Medical Director, Chrysler Corporation, Detroit; Secretary-Treasurer: W. N. WITHERIDGE, Director, Bureau of Industrial Hygiene, Department of Health, Detroit.

The Executive Committee is comprised of G. C. HARROLD, PH.D., Industrial Hygienist, Chrysler Corporation, Detroit; T. F. MOONEY, Industrial Hygienist, Ford Motor Company, Dearborn; A. O. THALACKER, General Manager, Detrex Corporation, Detroit; MARY ALTON, R.N., Industrial Nursing Consultant, Bureau of Public Health Nursing, Michigan Department of Health, Lansing; F. J. JARZYNKA, M.D., Medical Director, Bohn Aluminum & Brass Corporation, Detroit, and K. B. HUTCHINSON, Safety Engineer, Zurich Insurance Company.

Industrial Hygiene

THIS section has been established to study and help in the control of those conditions in industry which may injure the health of workers. Its services include: (1) Medical studies, in cooperation with private or industrial physicians, of workers who are thought to be suffering from sickness as a result of exposure to processes or materials used in manufacturing. (2) Examination of air in industrial plants to determine the concentration of harmful dusts, gases, vapors, fumes, mists or sprays present in the atmosphere of workrooms. (3) Recommendation of methods for the control of industrial health hazards. (4) Investigation of new industrial processes and materials to determine what their effect will be on health. (5) Aid in establishing adequate industrial medical services which are of benefit both to the worker and to the industry. (6) Assistance in making the facilities of the State Health Department available to every employed person.

—From "Functions and Services of the Louisiana State Board of Health," in *New Orleans M. & S. J.*, September.

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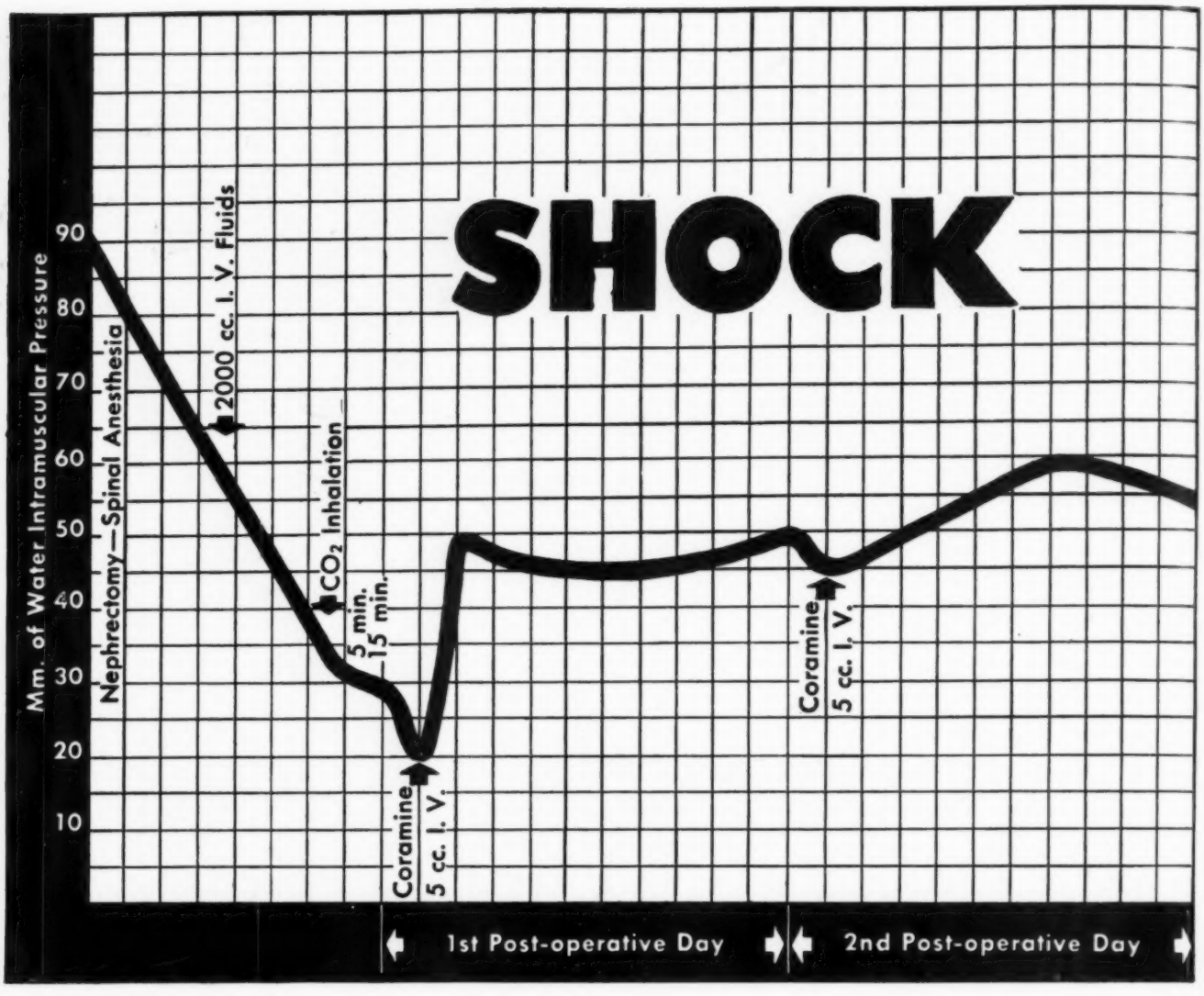

SHOCK is a complex syndrome having many causes and presenting many symptoms. Recent research[1] has demonstrated that in post-operative and post-anesthetic shock *intramuscular pressure drops before venous pressure fails.* This intramuscular pressure is of greatest importance in maintaining peripheral circulation and venous pressure is returned to normal by a restoration of intramuscular pressure.

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1. Gunther, Lewis, Engelberg, Hyman and Strauss, Ludwig., INTRAMUSCULAR PRESSURE, Am. J. Med. Sci., 204, 266-283, Aug., 1942.

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